THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXVI. No. 645.] LONDON, SEPTEMBER 21, 1875. [27TH YEAR.] Price 6d.

RAMSAY'S NEWCASTLE CANNEL
COAL. Analysis—10,000 cubic feet of gas per ton of coal; 26-candle gas; 13¼ cwt. coke per ton of coal.
The London Exhibition in 1851 was lighted with gas made from Ramsay's Cannel.
RAMSAY'S PATENT CONDENSED COKE.
DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.
GAS-RETORTS, introduced 1828. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.
Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 80, Bankside; and Honduras Wharf, Cubit Town. Large stocks kept.
Address G. H. RAMSAY, NEWCASTLE-ON-TYNE.

GENUINE TORBAY PAINT
AND
SPECIAL GASOMETER PAINT
(Mixed ready for use).
These Paints are now used in 100 Country Gas-Works, and by all (but one) of the London Gas Companies, on Gasholders, Scrubbers, Purifiers, &c. They will cover tar effectually. Also used by the Admiralty, War Office, Railway Companies, Founders, &c.
They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations.
The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov.* 2, 1866.
STEVENS & CO.,
(SUCCESSORS TO SAMUEL CALLEY. ESTABLISHED 20 YEARS.)
21, GT. WINCHESTER ST., LONDON.
WORKS: BRIXHAM, TORBAY.

PROUD'S
SPECIALITIES IN WOOD GRIDS
FOR
PURIFIERS & SCRUBBERS
MADE FROM THE BEST QUALITY
OF
WELL-SEASONED PLANKS.
SCRUBBERS FITTED WITH MR. LIVESEY'S BOARDS AT MODERATE COST.
BROOKFIELD WORKS,
103, ICKNIELD STREET EAST, BIRMINGHAM.

COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, BLAYDON-ON-TYNE,
Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS-RETORTS and OTHER OBJECTS in FIRE-CLAY," and they were also awarded at the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS-RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
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Coal Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.
JOS. COWEN & Co. are the only Manufacturers of FIRE-BRICKS and CLAY RETORTS at BLAYDON BURN.

JOHN RUSSELL AND CO.,
THE WEDNESBURY TUBE-WORKS, WEDNESBURY;
AND
THE ALMA WORKS, WALSALL,
Established at the commencement of Gas Lighting.
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69, UPPER THAMES STREET; COMMERCIAL STREET, SPITALFIELDS; 5, CHARLES STREET, SOHO; and 16, SOHO SQUARE, } LONDON
35, 36, 37, & 39, GRANBY ROW, MANCHESTER.
J. R. and Co. are the original manufacturers of Wrought-Iron Gas Tubes and Fittings, and Inventors of the LAP-WELDED TUBES for Locomotive and Marine Boilers.
J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water; Gun-Metal Cocks, Stocks, and Dies; Galvanized Tubes and High-Pressure Tubes, &c.
Lists may be obtained on application to
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JOHN BENT & SON,
BELL BARN ROAD, BIRMINGHAM,
MANUFACTURERS OF
WET AND DRY GAS-METERS,
OF
FIRST-CLASS MATERIALS & WORKMANSHIP;
ALSO, STATION-METERS, PRESSURE-GAUGES, STREET-LAMPS, REGULATORS, &c.
ESTABLISHED 1830.

THOMAS PIGGOTT & CO.,
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MANUFACTURERS OF
TELESCOPIC & SINGLE GASHOLDERS,
CAST & WROUGHT IRON TANKS FOR DITTO,
And Gas Apparatus of every Description.
Marine, Tubular, Cornish, Plain, Furnace, Saddle, and Range Boilers.
SUGAR, SALTPETRE, AND ALL KINDS OF PANS.
Roofs, Girders, and Bridges, and General Smith's Work.
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J. & H. ROBUS,
CONTRACTORS
FOR THE
ERECTION OF NEW & REMODELLING OF EXISTING GAS-WORKS.
RETORT-SETTING A SPÉCIALITÉ.
RETORTS SET, AND GUARANTEED TO BURN OFF A CERTAIN AMOUNT OF COAL, OR ELSE NO MONEY TAKEN FOR THE CONTRACT.
PLANS ON APPLICATION.
Retort-Setters sent to all parts of Europe and America.
Address, J. and H. ROBUS,
BELL GREEN, CATFORD, LONDON, S.E.

THE
NITSHILL COMPANY'S
DUKE OF HAMILTON'S
LESMAHAGOW
CANNEL COAL.
AGENT:
JAMES M'KELVIE,
HAYMARKET,
EDINBURGH.

LONDON, 1862. CLASS X.
LONDON, 1862. CLASS XXXI.
PARIS, 1867. SILVER MEDAL.
AMSTERDAM, 1869.
DIPLOMA D'EXCELLENCE.
MANCHESTER, VIENNA, 1873. THE ONLY MEDAL.
SILVER MEDAL 1875.

GEORGE GLOVER & CO.,
MANUFACTURERS OF
IMPROVED DRY GAS-METERS,
WARRANTED TO MEASURE CORRECTLY, AND NOT TO VARY.

EXTENSION OF PREMISES.
G. G. & Co. having had their premises entirely rebuilt, are now fairly in possession of large and commodious workshops, specially adapted to the requirements of the trade, and they are prepared to execute orders, large or small, with promptness and despatch.

THEY KEEP IN STOCK METERS OF ALL SIZES, UP TO 300 LIGHTS.

RANELAGH WORKS, RANELAGH ROAD, PIMLICO,
LONDON, S.W.;
236, GEORGE STREET, GLASGOW; and 30, LANCASTER AVENUE, MANCHESTER.
AGENT FOR AUSTRALIA:
A. DEMPSTER, 10, COLLINS STREET EAST, MELBOURNE.
G. G. & Co. have just been awarded a SILVER MEDAL for Gas-Meters and Gas Apparatus at the Exhibition of the "Society for the Promotion of Scientific Industry," Manchester.

SILVER MEDAL, PARIS EXHIBITION, 1867.

LLOYD AND LLOYD,

ALBION TUBE-WORKS, BIRMINGHAM,

MANUFACTURERS OF

WROUGHT-IRON TUBES AND FITTINGS

AND

LAP-WELDED IRON AND HOMOGENEOUS METAL BOILER TUBES.

Boiler-Tube Ferrules, Gun-Metal Gland Cocks, Water-Gauges, Whistles, &c.; Stocks, Taps, and Dies for Screwing, and Gas-Fitters Tools.

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THE

LANCASHIRE GAS-METER COMPANY,

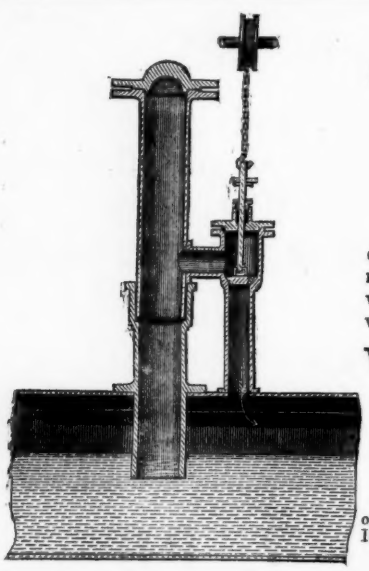
LIMITED,

FALCON STREET, OLDHAM,

MANUFACTURERS OF

GAS-METERS, GOVERNORS, EXPERIMENTAL GASHOLDERS, &c.

HENRY THOMAS, Managing Director.



COPP'S PATENT GAS APPARATUS

For the Removal of all Pressure caused by the Hydraulic Seal;

THE EFFECTS PRODUCED BEING

1.—A LARGE INCREASE IN THE YIELD OF GAS.

2.—AN ENTIRE PREVENTION OF THE DEPOSIT OF CARBON.

3.—THE ASCENSION-PIPES DO NOT CHOKE.

The apparatus is very simple in construction, and cannot get out of order, and being an outside addition to the present arrangement of works, can be applied so easily as to require no alteration of plant. It may be fitted whilst the retorts are in use, without interfering with the manufacture of gas. The cost is so small that the outlay will be repaid in a few weeks' working. For further particulars apply to the Patentee,

W. L. COPP, WATCHET GAS-WORKS, SOMERSET,

or, 232, BRIXTON ROAD, LONDON, S.W.

The following is the opinion of JAMES PATERSON, Esq., President of the British Association of Gas Managers:—

WARRINGTON, *July* 12, 1875.

DEAR SIR,—I am obliged by your drawings, and cannot but say to you that I entertain a favourable opinion of your patent arrangements for the removal of the hydraulic seal when the retorts are in operation. It appears to be amongst the best, and probably the best, of the various devices in use for that purpose.

Mr. W. L. COPP. Yours truly, JAMES PATERSON.

TRADE MARK

THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

CROWN TUBE-WORKS,

WEDNESBURY, STAFFORDSHIRE.

WAREHOUSE: SOUTHWARK STREET, LONDON.

JAMES RUSSELL & SONS, LIMITED,

PATENTEES & FIRST MAKERS OF WROUGHT-IRON TUBES,

ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

MANUFACTURERS OF

TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.;

GAS-FITTERS TOOLS, VALVES, COCKS, &c.

THOMAS PIGGOTT & CO.,

(Established 1822,)

SPRING HILL, BIRMINGHAM.

MANUFACTURERS OF

TELESCOPIC & SINGLE GASHOLDERS,

CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

London Agent: W. G. DAVIS, 2, BRABANT COURT, PHILPOT LANE, E.C.

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WELLINGTON TUBE-WORKS, TIPTON, STAFFORDSHIRE,

MANUFACTURER OF

EVERY DESCRIPTION OF TUBING, GAS, STEAM, HYDRAULIC TUBES AND FITTINGS,
EITHER BLACK, GALVANIZED, OR ENAMELLED HOT WATER TUBES AND FITTINGS,
CORE BARS, COILS, COCKS (IRON OR BRASS),
CHANDELIERS, &c., GAS-FITTERS' TOOLS, GAS TONGS, STOCKS, TAPS, DIES, &c., &c.,
HANDRAIL TUBINGS, IRON AND BRASS, PLAIN OR TWISTED,
TELEGRAPH TUBES OR POLES, &c., &c.

Established

1795.

JOSEPH CLIFF & SON,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

MANUFACTURERS OF ALL DESCRIPTIONS OF

FIRE GOODS, and Salt-Glazed Drain-Pipes.

LONDON WHARF:

Wharf No. 4, inside Great Northern Goods Station, King's Cross, N.;

LIVERPOOL—1, Back Leeds Street,

Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.

HODGE & CO.'S

IMPROVED VENTILATING SUN-LIGHTS

WITH TALC REFLECTORS AND SELF-ACTING VALVES

TO PREVENT DOWN-DRAUGHT;

VENTILATING GLOBE LIGHTS for DINING-ROOMS, LIBRARIES, &c.

Ormolu, Bronze, & Crystal Gaseliers;

MEDIÆVAL CHURCH WORK AND CORONÆ

COCKS, VALVES, and FITTINGS for GAS, STEAM, and WATER;

COLUMNS, BRACKETS, & STREET LANTERNS;

BLACK AND GALVANIZED BARREL COMPO AND TIN PIPE.

GAS ENGINEERS,

100, HATTON GARDEN, LONDON.

Drawings and Prices upon application.

THE

PATENT "UNIVERSAL" STEAM PUMP

WAS AWARDED, AT THE

VIENNA EXHIBITION, 1873,

THE GRAND PRIZE "MEDAL OF PROGRESS."

AT LILLE—GOLD MEDAL - - - - 1874. AT MANCHESTER—SILVER MEDAL - 1874.

OPINIONS OF THE PRESS.

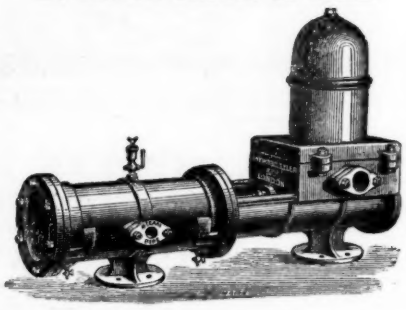
"The simplest machine of its kind."—*Engineering.*

"Remarkable for its simplicity and ease of action."—*Daily Telegraph.*

"None that we have noticed work so quietly."—*The Engineer.*

"Nothing invented in hydraulic steam power half so cheap and effectual."—*Griffith's Iron Trade Exchange.*

NO TAPPET VALVES OR GEAR.



IN USE IN SOME OF

THE PRINCIPAL GAS-WORKS IN LONDON, SHEFFIELD, PENISTONE, &c.,

FOR

TAR AND AMMONIACAL LIQUORS.

ONE SELECTED FROM AMONGST MANY TESTIMONIALS RECEIVED BY H. T. & CO.:—

"*Ardwick Bridge Chemical Works, Manchester, Oct.* 28, 1872.

"Sir,—The 'Universal' Steam Pump obtained from you, and which has been employed during the last six months pumping caustic soda at these works, still continues working satisfactorily,

"Yours truly,

(Signed) "Peter Hart, *Manager.*"

SOLE MAKERS,

HAYWARD TYLER & CO.,

84 and 85, UPPER WHITECROSS STREET, LONDON, E.C.

JOHN WRIGHT AND CO., ESSEX WORKS, BIRMINGHAM,

Beg to call the attention of MANAGERS and DIRECTORS of GAS COMPANIES to the following letter which they have lately received.

COPY OF LETTER RECEIVED FROM MAGNUS OHREN, Esq.

To Messrs. John Wright and Co., Essex Works, Birmingham. *Crystal Palace District Gas Company, Lower Sydenham, S.E.*

Dear Sirs,—In reply to your inquiries, I am glad to state that the use of GAS COOKING AND HEATING STOVES has been a complete success here. We have several hundred in use in our districts. We also find it advantageous to let out Stoves at a small rental. We have now 275 Stoves at rent.

The Stoves you make I can with confidence recommend, having so many in use, and giving satisfaction. I need scarcely point out to you the advantage to Gas Companies to recommend the use of Gas Stoves to their Gas Consumers, even where they do not supply them on sale or rent, as the use of Gas Stoves brings day consumption, and thus the Company make a profit by day as well as by night.—I am, dear sirs, yours faithfully, Magnus Ohren.

Size, 25½ in. high; 14 in. wide; 12½ in. back to front.

Price 50s., complete with Pan and Gridiron.

GAS HEATING STOVES

(TERRA COTTA AND IRON).

THE CHEERFUL STOVE.

COOKING STOVES.

BREAKFAST COOKERS.

BATHS HEATED by GAS

GAS STOVES

For Boiling, Broiling, Preserving, Heating Flat Irons, and for all other Domestic Purposes.

Gas Companies and the Trade who have not our Illustrated Catalogue are respectfully requested to apply for same.

A LIBERAL DISCOUNT to the TRADE.

No. 4003.

THE CHEERFUL GAS STOVE, with Copper Reflector,

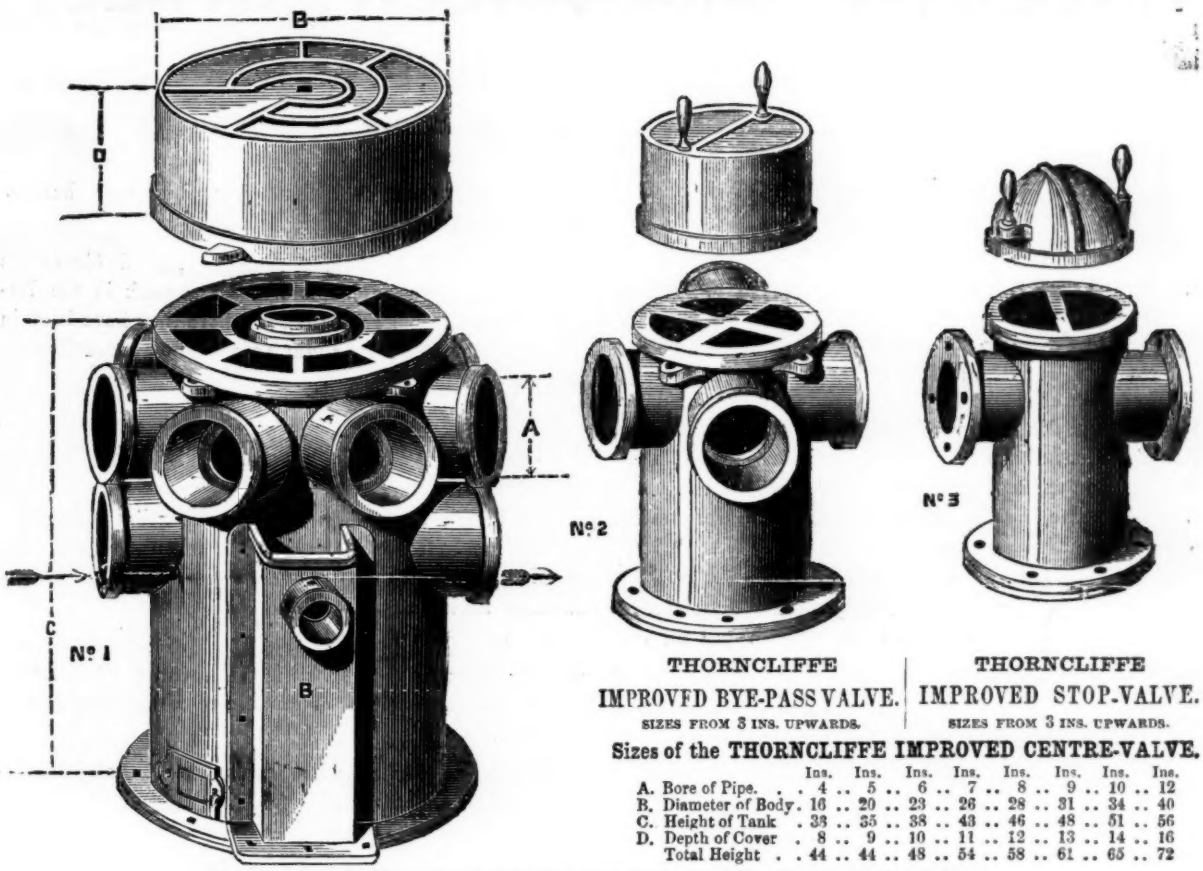
Has all the appearance of a Bright Fire.

PRICE from 32s.

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD.

IMPROVED CENTRE-VALVES.



THORNCLIFFE IMPROVED BYE-PASS VALVE.
SIZES FROM 3 INS. UPWARDS.

THORNCLIFFE IMPROVED STOP-VALVE.
SIZES FROM 3 INS. UPWARDS.

Sizes of the THORNCLIFFE IMPROVED CENTRE-VALVE.

	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
A. Bore of Pipe. . .	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10 ..	12
B. Diameter of Body.	16 ..	20 ..	23 ..	26 ..	28 ..	31 ..	34 ..	40
C. Height of Tank .	33 ..	35 ..	38 ..	43 ..	46 ..	48 ..	51 ..	56
D. Depth of Cover .	8 ..	9 ..	10 ..	11 ..	12 ..	13 ..	14 ..	16
Total Height . .	44 ..	44 ..	48 ..	54 ..	58 ..	61 ..	65 ..	72

In all cases the Covers are cast heavy enough to resist any required pressure.

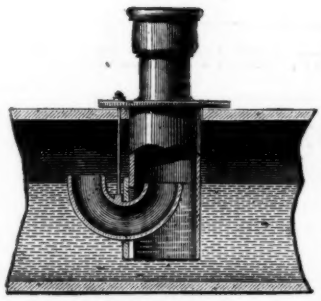
The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

N., C., and Co. also Manufacture and Erect

PURIFIERS, CONDENSERS, SCRUBBERS, GASHOLDERS, ROOFS,

And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.



Messrs. N., C., and Co. are also the Sole Agents for

HAWKINS' PATENT SELF-ACTING HYDRAULIC DIP-PIPES.

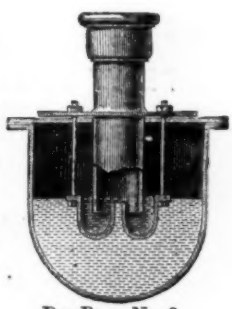
By their use the whole of the pressure caused by the Seal in the Hydraulic Main is entirely avoided, thus securing the many advantages long sought for.

Over 50 Gas Companies have already been supplied with them, many of which have been using them throughout their entire works continuously for over two years.

They can be applied to existing Hydraulic Dips, and at a very small cost.

They seal themselves in the same manner as the ordinary dip-pipes, therefore they are not likely to get out of repair.

By the aid of the adjusting screws they can be made to work on the old principle at pleasure.



DIP-PIPE, No. 1.

FOR PRICES, TESTIMONIALS, &c., APPLY TO

DIP-PIPE, No. 2.

Messrs. NEWTON, CHAMBERS, & CO., Thorncliffe Iron-Works, near Sheffield, Sole Agents;

OR TO THE PATENTEE,

J. G. HAWKINS, NEEPSEND GAS-WORKS, SHEFFIELD.

WILLIAM SUGG,

GAS ENGINEER,

VINCENT WORKS, VINCENT STREET,

WESTMINSTER, S.W.

PUBLIC LIGHTING
ON THE
AVERAGE METER SYSTEM.
LAMP METERS, IN CAST-IRON BOXES,
FOR
Fixing in the Footway, flush with the Pavement, with roughed Lids.

NOTE. — These meters were originally invented by William Sugg, in conjunction with Mr. Thos. Hawksley, Past-President of the Institute of Civil Engineers. They have been in use at Nottingham since 1866, and are still at work. The Gaslight Company and the Corporation were both quite satisfied with the results.

They were also introduced at Folkestone in 1869 by the late Mr. T. G. Barlow, Editor of the JOURNAL OF GAS LIGHTING. The success of the system put an end to a very long and troublesome dispute between the Gas Company and the local authorities. They are still at work with the same satisfactory results.

They have since been used in several important towns, with equally good results.

No other kind of Lamp Meter has ever achieved so complete a success.

Mr. Ellice Clark, C.E., at the last meeting of the Association of Municipal and Sanitary Engineers and Surveyors, read a paper "On the Average Meter System." Referring to Folkestone, he said that—"The Average Meter Indicator system has been in operation the last five years, and found to act well. Sugg's Self-Acting Regulator is used, adjusted as nearly as may be practicable to consume 4 feet per hour, and so very satisfactory is this apparatus, that for the last two years, after burning 7294 hours, it is found by the Average Meter to have consumed 29,227 feet, as against 29,176 feet as per Regulator, being only 51 feet in excess of that which the apparatus is adjusted to consume."—*See* JOURNAL OF GAS LIGHTING, *May* 18, 1875, *page* 728.

WILLIAM SUGG'S
PATENT PUBLIC LAMP GOVERNOR,
WITH
STEATITE INCORRODIBLE BURNERS.

Guaranteed to give the greatest amount of light for the quantity of gas consumed.

The amount of light for a like quantity of gas is at least 30 per cent. over that given by those burners generally employed in public lighting.

NOTE.—Many of William Sugg's original Governors first applied to public lamps are still at work in the Imperial Gas Company's Districts, where they have been in constant use, with very slight repairs, now more than 14 years.

Upwards of 400,000 of these, and those of William Sugg's later inventions, are in use in various parts of the globe.

The Patent Lamp Governor is especially serviceable for home and foreign use. It can be taken to pieces, new leathered, and put together again in a few minutes by any ordinary workman.

By the principle of Double Regulation, a finer and steadier light is secured with the greatest illuminating power, and the least loss of gas in case of the breakage of a burner.

This system can be readily applied to all Lamp Governors, new or old.

LEVER COCKS FOR POLE LIGHTING.
STRONG AND SERVICEABLE.

These Cocks are carefully made so as to avoid Stoppage by Naphthaline, Leakage, and Friction.

WILLIAM SUGG'S
POLE LIGHTERS
Are acknowledged to be the best of their kind, and are almost universally adopted.

This is one of the spécialités of the house.

LANTERNS VERY STRONG, WITH PORCELAIN TOPS.

MODERN STREET LIGHTING,
BY WILLIAM SUGG, A.I.C.E.

Price 1s. 6d.

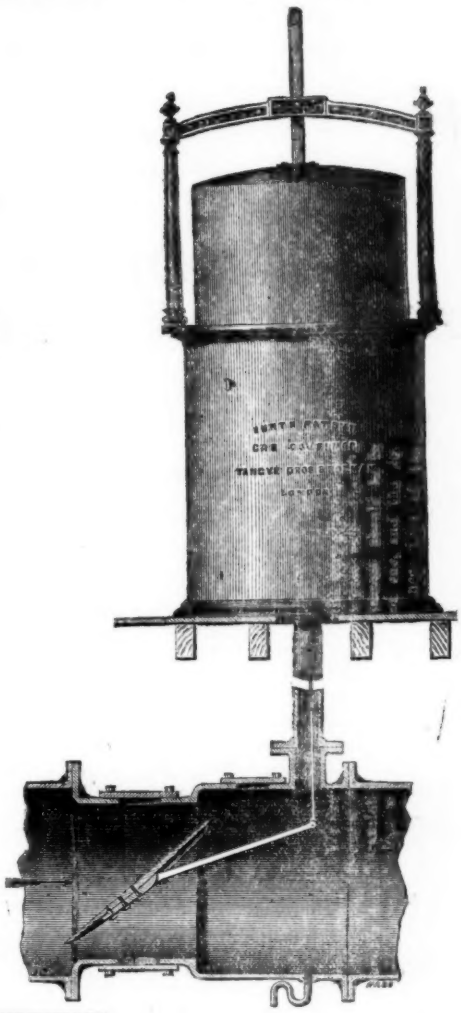
WILLIAM SUGG,
GAS ENGINEER,
VINCENT WORKS, VINCENT STREET, WESTMINSTER, S.W.

TANGYE BROTHERS AND HOLMAN,

LAURENCE POUNTNEY LANE, LONDON, E.C.,

SOLE MAKERS OF

HUNT'S PATENT EQUILIBRIUM GAS GOVERNOR.



In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown at C on the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the holder can be placed at any convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.

These Governors have been adopted by several leading Gas Companies, among whom are the following:—

The Gaslight Co.—two 36 in. at Blackfriars.
" " a 36 in. at Goswell Road.
" " a 24 in. at "
" " a 24 in. at Whitechapel.
" " an 18 in. at Bow Common.
" " a 24 in. at Beckton.
" " a 6 in. at "
The London Gas Co.—a 24 in. at Nine Elms.
" " an 18 in. at "
" " an 8 in. at "

The Exeter Gas-Works—a 24 in.
" Abergavenny Gas-Works—a 10 in.
" Birmingham Gaslight Co.—an 8 in.
" Monmouth Gas-Works—an 8 in.
" Devonport Gas-Works—an 8 in.
" Cannes Gas-Works—an 8 in.
" Mentone Gas-Works—an 8 in.
" Rochdale Gas-Works—a 4 in.
" Imperial Gas Co., a 12 in at Great Cambridge Street.

TESTIMONIAL.

The Gaslight and Coke Company, 9, Water Street, New Bridge Street, Blackfriars, E.C., Feb. 27, 1875.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

Yours truly,

(Signed) JOHN JOHNSON.

VIENNA EXHIBITION, 1873.—The highest prize and only Medal "for Progress" for Direct-Acting Steam Pumps for general purposes was awarded to TANGYE BROTHERS AND HOLMAN, Engineers, London, for

THE "SPECIAL" DIRECT-ACTING STEAM PUMPS.

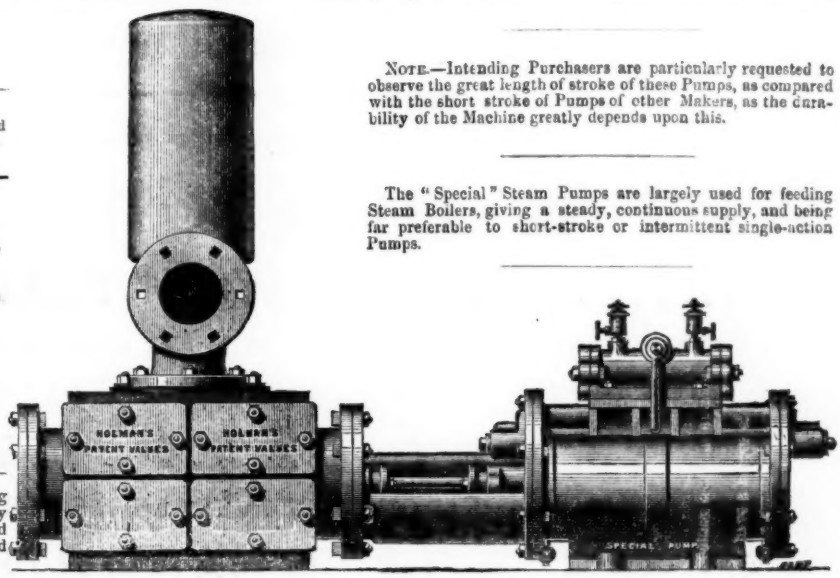
Upwards of 12,000 have been sold in England and America.

In use in a Hundred Gas-Works in the United Kingdom for Pumping Ammoniacal Liquor, Water, or Tar.

The following are a few of the leading Sizes:—

Diameter of Steam Cylinder.	Diameter of Water Cylinder.	Length of Stroke.	Gallons of Water per Hour, Approximate.	Reduced Prices.
3	1½	9	450	£16
4*	2	9	815	18
3	3	9	1,830	18
5*	3	12	1,830	22 10
4	4	12	3,250	25
6*	4	12	3,250	30
5	5	12	5,070	32 10
7*	5	12	5,070	40
6	6	12	7,330	40
8*	6	12	7,330	50
7	7	12	9,750	50
10*	7	12	9,750	65
8	8	18	13,000	65
10	9	18	16,500	80
10	10	24	20,000	100
12	12	24	30,000	140

* These sizes being usually selected for pumping Tar and Liquor, are always in stock, or nearly ready, fitted with all pump details in iron, and extra length distance piece between steam and pump cylinder at a small extra cost.



NOTE.—Intending Purchasers are particularly requested to observe the great length of stroke of these Pumps, as compared with the short stroke of Pumps of other Makers, as the durability of the Machine greatly depends upon this.

The "Special" Steam Pumps are largely used for feeding Steam Boilers, giving a steady, continuous supply, and being far preferable to short-stroke or intermittent single-action Pumps.

London 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON & CO.,

(SUCCESSORS TO SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

MANUFACTURERS OF PATENT

WET & DRY GAS-METERS,

STATION-METERS WITH PLANED JOINTS,

GOVERNORS, PRESSURE REGISTERS, GAUGES,

AND EXPERIMENTAL APPARATUS,

STREET-LAMP METERS,

AND REGULATORS FOR AVERAGE METER INDICATION.

METERS FOR MEASURING WATER.

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THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, SEPTEMBER 21, 1875.

Circular to Gas Companies.

COMPETITION in gas supply is now so rare, that we have to look to other undertakings to learn the probable course of events, when two companies engage in a similar enterprise, in what we may call the same district, and one attempts to make a reduction of charges. The companies owning telegraphic cables from this country to America just now offer a case in point. The Direct Cable Company have recently reduced their charge for transmission to one shilling per word. Necessarily the Anglo-American Company adopt the same tariff, and what is the first result? The earnings fall off to about one-half of the previous rates, and, calculating from present returns, neither company will be able to pay more than a 2 per cent. dividend. And yet, in the City, there is a wild speculation in the shares of the two companies. Why? Because it is clearly foreseen that the consequence of the competition will be the amalgamation of the two companies, and the establishment of a stronger monopoly than was originally possessed by the Anglo-American Company. One of the following results must be regarded as inevitable—either a coalition, or a working agreement between the two companies. There is another possibility. The Direct Cable Company have but one line, and small resources. A serious interruption in their communication may occur any day, and the company will be lost. They will drop, by a natural process, into the hands of the monopolists they started and intended to destroy, and the public, whose interests they professed to study, will be sacrificed without remorse.

All this has been illustrated over and over again in the history of competing gas undertakings, and we should have thought it would have been unnecessary to refer to the lesson inculcated. To mention no others, our readers will remember the results of competition at Perth, at Sheffield, and Cambridge, the competing works in each case having been suggested by the same individual.

At Perth there were at one time two competing companies, and then another was projected by an "eminent" engineer. No works, however, were erected by the last, and the "New" Consumers Company, as it was called, soon amalgamated with the Consumers. Ruinous competition with the old company, of course, ensued, which was ended, first by a working agreement between the two companies, and then by amalgamation. Eventually the amalgamated companies were bought up by the local authority in Perth, and no one can say that the citizens were in the least degree benefited by the competition carried on in gas.

At Sheffield, after making considerable losses, the competing company sold works which had cost them £54,000, for £39,000, which was no bargain for the old company, inasmuch as the plant was so bad that it had to be broken up and sold for old materials. A similar result ensued at Cambridge, where the two companies coalesced and the monopoly was re-established, the unfortunate shareholders in the new company losing all their subscribed capital. We need not again refer to Limerick, where competition still exists, with a serious annual loss to the Corporation. We think we have given enough matter for the Swansea ratepayers to reflect upon, and we hope that common sense will prevail at the meeting of the Town Council to-morrow. The council, it appears, have one remunerative property—the cemetery. Let them strive to make this as little remunerative as possible, and leave the supply of gas to abler hands.

One very serious remark must, however, be made for the benefit of Mr. Alderman John Jones Jenkins. We last week gave expression to grave doubts on the point, and now we have the strongest testimony possible, short of the affirmation of the deceased gentleman himself, that the late Mr. Jabez Church never saw, and therefore could not have approved of the plans, estimates, and specifications for gas-works now before the Town Council of Swansea. We must leave Mr. Alderman John Jones Jenkins to explain away the inaccuracy of the statement he made to the council. He may be a dupe, he may be something else; but we cannot allow the memory of a deceased gentleman of great talent and unquestioned probity to suffer from reckless assertions. We make no further comments on the matter. The question now before the Town Council is, perhaps, financially the most important they have ever discussed. They propose to enter upon a course which, without reference to the interests of the gas company, we may say can only result in loss and disaster, and they are stimulated to adopt this course by—to use a mild term—a downright misstatement of facts. The Town Council must take care that they are not hoaxed in this important business.

The Bristol United Gas Company is a very prosperous undertaking. That it has the confidence of the local investing public, is shown by the fact that the new stock issued, of the value of £100, sold by auction for an average price of £187 10s. That the bulk of the consumers are satisfied, can hardly be doubted, for the company have recently reduced the price of gas to 3s. 6d. per 1000. Nevertheless, an attempt is being made to get up an agitation in Bristol, against what is called the gas monopoly. We have no doubt it will prove a ridiculous failure, but it may be alluded to as one of the signs of the times.

The Southampton Town Council, as our readers have been informed, proposed to bring forward a Bill to effect a compulsory purchase of the undertaking of the Southampton Gas Company. The ratepayers, however, we think wisely, refused their assent to the promotion of the measure, and the Bill was withdrawn. But there is a little account to settle in connexion with the business, and the amount of it is £1383 3s. 9d., which, we are told, is equivalent to a rate of 2½d. in the pound. We offer no decided opinion, but we have a belief that the council might be surcharged for this amount, if any enterprising ratepayer took up the matter.

At Southampton, too, there is an assessment dispute; and it is alleged, on the one hand, that the gas undertaking is much undervalued, while the company are about to appeal against the last valuation. The company have, however, very sensibly proposed to confer with the Rating Committee, and see if some reasonable adjustment cannot be effected, so as to avoid the expense of appeal to quarter sessions. The proposal seems to have been well received by the Rating Committee, and we hope that before now the dispute has been amicably settled.

We mentioned, a fortnight ago, that the lighting inspectors of Barking, dissatisfied with the charges of the Barking Gas Company, had proposed to employ the Dietz petroleum lamps for public lights. The inspectors have, since then, resolved on taking this step. We do not find fault with them, nor shall we, if they save the 50 per cent. anticipated. We have recently received letters from correspondents, expressing their opinions of the petroleum lamps already in use at Walthamstow and elsewhere, but we have not inserted them, since we expect reports from the local authorities in whose districts the lamps are exhibited. We may say, however, that nowhere is satisfaction expressed at the illumination given by the lamps.

The Corporation of Salford may be congratulated on having secured the services of Mr. Samuel Hunter, late of Rochdale, as their superintending gas engineer. After all the annoyance which a sensitive man must have felt at the persistent attacks of two ill-natured members of the Rochdale Town Council, it must be a great satisfaction to Mr. Hunter to have been appointed, almost unanimously, consulting engineer to the Rochdale undertaking.

Mr. Spice must have altogether misunderstood the purport of our remarks last week. They were not "depreciatory" of petroleum gas; they were a simple abridgment of the statements which were before us. No one will be better pleased than ourselves to see Mr. Spice produce his gas for 1s. 6d. per 1000 feet; and, if it can be done, we are quite sure Mr. Spice is the man to do it. Americans are still active with projects for carburetting water gas, and to-day we publish the description of a process, which looks very like the last invention of poor Isham Baggs. It will be seen, however, that the cost of the gas (quality not stated) is said to amount to about 2s. 6d. per 1000 in Pennsylania.

In view of the requirements of the Conspiracy and Protection of Property Act, we have had printed, in large type, the 4th section of the Act, which it is now necessary to post in a conspicuous place in all gas and water works. Copies can be obtained at our office, as announced in the advertisement columns.

Water and Sanitary Notes.

If sanitary progress is to be measured by the debts incurred by local authorities for what are called sanitary works, we have undoubtedly made great advances within the last ten years. A report, just presented to the Local Government Board, by Mr. J. Simon, informs us that, from 1864 to 1870, the loans contracted by local authorities for permanent works, mainly sanitary, averaged £692,000 a year. Thence, to the end of 1872, the annual average exceeded £844,000, and, in the last two years, the amount has reached a million and a million and a half. It is not alleged, and we believe it could not be maintained, that this outlay of money has at present made any impression on the death-rate of the country, nor even of the districts on which the money has been spent. So far, however, as the expenditure has been incurred in providing an adequate supply of good water, it must be approved, and benefit is certain to result. As regards sewerage works, it is impossible to say so much. Without alleging anything against them, we may express an opinion that their value, in a sanitary point of view, has yet to be proved. Most certainly the five millions we have expended in this metropolis have not yet diminished the death-rate, which remains obstinately the same as it was before the Board of Works came into existence, and our main drainage system was commenced.

It must not, however, be supposed that we deprecate the expenditure of money on sewerage works. What we have endeavoured to inculcate is, that sewerage is not to be considered the be-all and end-all of sanitary work. It is not very certain, as Mr. W. R. Greg says, that we are, as yet, on the right track with regard to sanitary matters, and all we contend for is continued unprejudiced observation, and careful ratiocination. We protest against the blind adherence to the dogma of the day, and should be glad to see a more independent tone assumed by our sanitary inspectors. In the absence of this, and of better light, we must continue to counsel local authorities to reflect before they incur debts for so-called sanitary improvements, and, above all, just now, to wait. If by-and-by they are urged to large expenses, they will have a stronger claim on that portion of a surplus which Mr. Greg devoutly wishes to see expended on sanitary experiments.

Having more than once blamed the Corporation of London for neglecting to provide accommodation for the poor population they dispossessed when making the Holborn Valley improvements, we are bound to report the completion of a model lodging-house, close by New Charterhouse Street. As described to us, it is in every way worthy of the Corporation of London, who, as we have repeatedly said, when they do a thing, almost always do it well. We are glad to read that this is only the first of several similar buildings which the Corporation intend to erect on their vacant spaces. It must, however, be understood that these are no more dwellings for the poor than Peabody's Buildings. They will be admirably adapted to receive the well-paid labourers and *employés* in the Meat Market, who have now to thread their way from Hoxton and Bethnal Green to the market in the small hours; but the poor of London will be still unhoused. On this point we shall presently refer to the labours of Miss Octavia Hill, who appears to be accomplishing a work which Sir Sidney Waterlow and the Peabody trustees have equally failed to achieve.

Last session the Metropolitan Board of Works led the attack on the gas companies, and the Corporation of London played what is commonly called "second fiddle" in the business. Now it is proposed that the Corporation shall take the lead in a similar attack on the water companies next year. At the first meeting of the Common Council after their recess, it was proposed (or we ought to say it was intended to propose) that the Board of Works and Corporation should jointly introduce a Bill—first, to transfer the management of the water supply from the companies to the Corporation and Metropolitan Board; and secondly, to do what may be necessary to give a better supply of water, and to place the water-rates on a more suitable and equitable basis. We hardly know what is meant by the first of these proposals. It does not look like purchase, and it is fair to say that it gives no hint of confiscation. If the Corporation and Board of Works wish to take the management of the undertakings out of the hands of the companies, and will pay the shareholders their full dividends, we have no doubt that they may obtain their desires. As to the second proposal—to do what may be necessary to give a better supply of water to the public—we should be very glad to get an idea as to what is considered necessary. The quality of the water supplied in this metropolis is unsurpassed; that a constant supply is not afforded, is simply the fault of the Corporation of London and the Metropolitan Board. The motion referred to above stands over until the next meeting of the Common Council, at which it will, no doubt, be carried.

THE AVERAGE METER SYSTEM IN PADDINGTON.

The average meter system, as applied to public lights, is, we are happy to see, being more and more adopted; and, in view of further extensions, we may here quote from Mr. Weston's report a description of the meter adopted in Paddington, at the suggestion of the Metropolitan Gas Referees. It is really the meter first employed by Mr. Hawksley at Nottingham, and has already been described in our columns, in a paper by Mr. C. Hawksley on the working of the system in that town. The reproduction of the account of the meter to-day needs no excuse:—

It may not perhaps be out of place in this report to give a brief description of the lamp-meter in use. It is a well-known fact to gas engineers and gas manufacturers, that ordinary consumers meters of small capacity are very unreliable in their registration when applied to street-lamps, and should not on any account be used for such purposes; hence the necessity of having a meter specially constructed, in order that the friction may be reduced to a minimum. In the meter used scarcely half a tenth pressure is absorbed by friction. It must not be expected from this that any meter will supply gas for ordinary lighting purposes at this low pressure; but, supposing the pressure on the inlet-pipe to equal a column of water 1 inch in height, the pressure at which the gas would be indicated on the outlet-pipe, after passing the measuring-drum, would be 9½ tenths, showing that only half a tenth has been absorbed by friction in working the meter. This result is arrived at by the increased diameter of the measuring-wheel, which is equal to a 5-light meter, and diminished in depth of rim to nearly equal the capacity of a 3-light ordinary meter, and the quantity passed per revolution being ·125 of a cubic foot, or 12 cubic feet per hour. This extra diameter assists in distributing the pressure further away from the central axis, thereby increasing the leverage of the measuring-drum, and, of course, greatly reducing the friction. This class of meter cannot by any chance be overtaxed, or even worked up to its maximum power, having only one light of 5 cubic feet per hour to supply, and that controlled by a *governor at the burner*.

The cause of the varying quantities recorded in the meters after passing through the *governors* to the burners, is due in a great measure to the partial stoppages in the service-pipes belonging to the company, such as water, defective supply-pipes, naphthaline, &c., as well as different pressures given during the hours of burning, and more especially to the many atmospheric changes that take place during the seasons; for instance, during sudden variations of temperature, numerous lamps, both metered and unmetered, especially the latter, will have the gas way so impeded with naphthaline that scarcely three feet of gas per hour will be passing, and in some instances they go out altogether, in consequence of this crystalline substance forming so rapidly in the fittings, thereby causing incessant inconvenience and trouble. So soon as discovered, the lighters have been instructed to remedy the defect by pouring a little paraffin oil through the cocks and stand-pipes, which generally has the effect of dissolving this substance.

In a letter Mr. Weston addressed to the JOURNAL, which was published in the number for Aug. 17, appeared a very useful table, showing the possible variations in the quantity of gas passed by governors, duly tested, at different pressures.

Correspondence.

THE CORPORATION OF SWANSEA AND THEIR GAS SUPPLY.

SIR,—I see by the report of the last meeting of the Town Council of Swansea, in this week's JOURNAL, that Mr. Alderman Jenkins there stated that my late father saw and approved the plans and estimates, now before the Town Council, for the erection of gas-works capable of producing 200 millions of cubic feet per annum, with all the necessary mains, &c., for the sum of £48,000. Now, without going into the absurdity of such a statement, or such an estimate, I, as my late father's partner, and well knowing everything that has transpired in our office for years past, beg most emphatically to deny it, for, as you justly say, sir, "Mr. Church was an able and educated gas engineer, and a man of character and honour." It is to be regretted that a person in the public position of Mr. Jenkins should make such unwarrantable and unfounded statements.

JABEZ CHURCH.

17B, *Great George Street, Westminster, Sept.* 18, 1875.

METERS WITH CONSTANT WATER-LEVEL.

SIR,—Looking over your report, of the 14th inst., of the proceedings at a recent meeting of Société Technique du Gaz, in Paris, I was amused to observe a bantling of my own, some thirteen years old, and entirely lost sight of by me for these years, has been playing the part of *l'enfant trouvé*, and, setting up a claim to French parentage, has succeeded in obtaining an introduction to French society, and almost, but not quite, succeeded in ignoring his native origin as from north of the Tweed.

> Breathes there a man with soul so dead,
> Who never to himself hath said,
> "This is my own, my native land?"

M. Rouget's paper on "Meters with Constant Water Level," as described, is in principle and mode of action precisely similar to that which I introduced for the first time in 1862, and exhibited in the London Exhibition of that year. It received very favourable notice at the time, at home and abroad. The Paris paper *Le Nord*, of Sept. 15, 1862, had this notice:—

EXPOSITION INTERNATIONALE DE LONDRES.

Mesurage du Gaz.—"Dans la classe 31, et sous le No. 6340, se trouve une invention fort importante et fort utile, qui met les consommateurs de gaz à même de vaincre tout-à-fait la seule difficulté sérieuse qui se présente dans l'emploi des *compteurs à gaz humides* pour mesurer la quantité que l'on aurait brûlé. Au moyen du procédé en question, on peut saturer le gaz avant qu'il ne pénètre dans le compteur. En effet, le gaz parcourt, dans un état sec, les canaux étroits d'un vase à part, presque tout-à-fait rempli d'eau; de sorte que le gaz subit, de tous les côtés, l'influence de l'humidité. Le résultat en est que cet instrument est un des plus parfaits pour mesurer le gaz, et pour établir, par conséquent, le plus justes calculs entre le fournisseur et le consommateur. Cette invention attire l'attention de beaucoup de visiteurs à l'Exposition Internationale."

The account of this simple contrivance, as quoted from *Le Nord*, is brief and comprehensive as applying to my original apparatus, or to the modification by M. Rouget. If M. Rouget succeeds—as I sincerely wish he may—in getting meters with the saturating principle introduced, he will certainly secure to gas companies and consumers the most perfect and reliable measurer of gas we have hitherto seen, and remove the only objection that has attached to the wet meter—viz., the fluctuations of the water-level. This I had not facilities or opportunities suitable for carrying out.

J. REID.

8, *George Street, Edinburgh, Sept.* 16, 1875.

STATION-METERS WITHOUT CASES.

SIR,—Although this out-of-the-way place has not yet been enrolled among those, where gas-works are established, and the writer's name is unknown among the members of the British or North British Association, yet I have the comfort of knowing, through the pages of your JOURNAL, a good deal of what goes on in the outer world of gas lighting; and, observing your readiness at all times to afford to inquirers the best information on matters connected with the profession, I venture to submit a question of some difficulty to myself, which I should like solved by some of your more privileged correspondents.

I have never had a station-meter; and the cost of these machines is so great, that I fear there is little prospect of procuring one. But there is a proverb with us, "Ettle for a gown and ye'll maybe get a sleeve o't." Now, I have already got a big-enough cylinder or drum for a station-meter; but, losh keep me! the cost of fitting it up with a *case* will be twice as much as the value of the drum. My question is, could not I do without a casing altogether, by putting a hood on the outlet end of the drum the same as on the inlet, furnished with entrance and outlet pipes, entering into the holes at the ends, with the usual form of bends, and thus confine the gas by the water seal within the enclosure? I have an old rectangular vat from the distillery, into which I propose submerging the said drum to the proper depth in water, and, putting on a registering index at one of its axles, to count its revolutions, and thus record the volume of gas as it passes in at one end and out at the other.

Now, tell me fairly what objection, if any, can there be to the construction or action of a meter of this simple form?

I know the strength of prejudice in favour of old established notions, and the difficulty of getting old fogies to move out of the beaten track. I should like very much if some of the younger managers of gas-works would consider the question, and let me have the benefit of their clear-headed judgment upon my proposal in an early number of the JOURNAL.

Believe me, Le durachd beannachd a'r son do t'allintinn,

A. MICAWBER, Jun.

Glenmutchkin Gas-Works, Sept. 18, 1875.

P.S.—Should you or any of your friends come so far north, I shall be glad to hand you all free passes over our railway so far as it goes. If for nothing else but a taste of the mountain dew, to be got *unadulterated* at that establishment, this object might, of itself, be an excusable temptation.

A LADY DIRECTOR.—At a meeting of the Keswick Gaslight Company, Miss Powley was elected a director in the room of Mr. Dover.

Legal Intelligence.

COURT OF BANKRUPTCY, LONDON.—FRIDAY, SEPT. 17.

(*Before Mr. Registrar* MURRAY.)

In re CHARLES EDWARD NEWCOMMEN.

This was a first hearing for proof of debts and choice of trustee.

The bankrupt, who is described as a gentleman residing at 51, Maddox Street, London, had, in connexion with several other gentlemen, entered into a guarantee with the Bradford Corporation to deal with certain sewage, the corporation having undertaken to build the sewers and works.

Mr. A. H. MILLER now appeared on behalf of the corporation, who tendered a proof for £30,000 for work and labour done, &c.

Mr. SEDGWICK opposed the proof on the ground that it was a proof for unliquidated damages, and should be proved through the trustee, as provided by the 31st section. A trustee was not yet appointed. If the proof of the corporation were admitted, they would be able to appoint their own trustee, and adjudicate upon their own debt.

Mr. MILLER: We say it is not a contingent debt, but for work and labour done, and money paid.

The REGISTRAR said it seemed to him very much like a contingent debt. He should like to see the guarantee.

Mr. MILLER said he would admit that the proof was rather imperfect in form, and for that reason he should ask that the meeting should be adjourned for the attendance of the town-clerk of the corporation, who could be examined on the matter if necessary, as he was perfectly acquainted with the whole matter.

The REGISTRAR: What can the clerk do more than assess the damages?

Mr. MILLER: The town-clerk is in a position to state the exact amount of the debt due without assessing the damages.

Mr. SEDGWICK said that the work had been done by the corporation, who had instituted an action against these gentlemen, called the Peat Engineering and Sewage Filtration Company, for the non-performance of the guarantee. He thought that this was not the time at which such a proof should be admitted.

The REGISTRAR said he would adjourn the meeting upon the undertaking of Mr. Miller, on behalf of the corporation, to pay the costs of the adjournment.

Mr. MILLER agreed to this, and the meeting was adjourned for a fortnight.

SOUTHAMPTON PETTY SESSIONS.—MONDAY, SEPT. 13.

(*Before Mr. J. H.* COOKSEY *and Mr. D.* DAVIS.)

PROCEEDINGS UNDER THE 20TH SECTION OF THE GAS-WORKS CLAUSES ACT, 1871, TO DETERMINE DISPUTED CONSUMPTION OF GAS.

Mr. KILLBY, who appeared for the plaintiff Ireland, in the case reported last week, wherein the bench decided that they had no jurisdiction to adjudicate between him and the Southampton Gas Company on the difference between them as to the quantity of gas consumed, the meter having failed to register, now applied, as arranged, for a case for the opinion of the superior court as to the point raised.

The magistrates granted a case.

BRISTOL POLICE COURT.—TUESDAY, SEPT. 14.

(*Before Messrs.* ROBINSON, NASH, *and* FULDGE.)

DISPUTED GAS ACCOUNT.

Mr. *J. Ullathorne*, of the Drawbridge Hotel, St. Augustine's Parade, Bristol, was summoned, under the 23rd section of the Gas-Works Clauses Amendment Act, 1871, for refusing to pay, when repeatedly applied to, £27 12s. 2d. for gas supplied up to June 30 by the Bristol United Gas Company.

Mr. G. BRITTAN appeared in support of the summons.

Defendant, in answer to Mr. Gore (magistrate's clerk), said he had cause to show why a distress should not be issued against him, but his solicitor, Mr. Benson, was absent.

Mr. GORE said the summons was served on Saturday, and there was ample time to get another solicitor.

Defendant: But I do not require another.

Mr. BRITTAN explained that the company took these proceedings because they did not like to adopt the alternative course of cutting off the supply and suing the defendant in the county court, as that would cause great inconvenience and annoyance in the hotel, though defendant had treated the company badly and with great impudence in the matter. Defendant had been a customer for some years. The accounts were sent in quarterly, but defendant raised some dispute, alleging that an improper quantity of gas had been charged for, owing to defects in the meter. More than a dozen applications for payment had been made, and defendant at length offered, without prejudice, to pay half the amount said to be due. Mr. Brittan read a letter, in which defendant said the Licensed Victuallers Association, of which he was secretary, would assist him in resisting this imposition.

David Jefferies, meter inspector for the company, having proved the quantity of gas consumed, as registered by the meter,

Mr. GORE said the Act made the register of the meter *primâ facie* evidence of the quantity consumed.

Defendant: Then the sooner we get the law altered the better. The citizens suffer under a very gross monopoly.

Mr. GORE said the defendant might require the magistrates to test the meter, but defendant did not ask for this.

The BENCH ordered the issue of a distress warrant for the amount claimed, and costs.

Defendant: If you decide that, I pay for the extortion under protest. Honest men have no chance of living against this monopoly.

ILKLEY LOCAL BOARD WATER-WORKS.—It having been found that in dry seasons the supply of water to the town, in consequence of the rapid growth of the inhabitants, was not sufficient, the local board very wisely determined to extend their water-works. In carrying out Mr. M'Landsborough's scheme, the engineer, Mr. Filliter, of Leeds, in addition to other improvements, proposes to exclude all surface water for the present, by impounding the several streams at their sources, and conveying the water in sanitary and iron pipes direct to the service reservoirs. The water will thus be secured from all organic taint or fouling from stones or other causes, and the rapid descent will prevent any taste being contracted from the pipes. A compensation for the rejected surface water, which was included in the original gaugings, will be made by taking in a number of minor springs, whose tiny rills are intersected from Backstone Beck to Weary Hill. On examination these springs were found to be more numerous and of greater volume than was anticipated. This, however, will be exceeded by spring water of the most unequalled purity. Supposing the new works to be carried out as proposed, and without additional storeage, there will be a liberal allowance per head to a population of 12,000 inhabitants. Respecting the new works, some disappointment has been expressed at the smallness of the two reservoirs. It is found, however, that the supply is constant, and that at Hill Top, where eight acres of land have been appropriated, a large reservoir would have been a difficult and very costly affair. It is intended to retain the old reservoir, which was not contemplated in the parliamentary scheme, and connect the three together; thus they will have a storeage capacity equal to two days minimum supply. The works are situated just beyond the Wells House, near the Keighley Road. They are of the most substantial character, and are expected to be finished before the end of October. The estimated cost is about £9000.—*Bradford Mail.*

Miscellaneous News.

METROPOLIS WATER SUPPLY.

Major Bolton's report for August states that throughout the month the condition of the water in the river Thames at Hampton, Molesey, and Sunbury, where the intakes of the West Middlesex, Grand Junction, Southwark and Vauxhall, Lambeth, and East London companies are situated, was good. The highest flood state of the river at Hampton during the month was 9 inches above the (6 feet) summer level, and the lowest was one inch above summer level. At Seething Wells, Kingston, the state of the water in the river was good during the month. The highest state of the flood water at this place was 1 foot 1 inch above, and the lowest was at summer level. The highest temperature of the water during the month was 70°, and the lowest 63°, while the highest temperature of the air at the same place was 85°, and the lowest 59°. These observations were made daily at 9 a.m. The rainfall during the month was ·75 inches. The heavy floods mentioned in the report for July, and which prevailed throughout that month, ceased to affect the Thames at the above intakes after the 8th of August; from that date until the end of the month the condition of the river was clear, although for several days after the floods had ceased, the water was stained and coloured, but without any turbidity, the most efficient filtration appears to fail to remove this stain or colouring matter from the water, which is otherwise perfectly clear and bright. The colouring matter (which is in solution) is attributed to the soaking of dried vegetation, and it invariably prevails during the harvest season if the weather is wet, when the effluent waters which are discharged into the Thames above the intakes are found to be stained to a dark tan colour. All the companies effectually filtered the water supplied by them to the metropolis during the month of August, and it was delivered into their mains perfectly clear and bright, although they were unable to remove the slight colouring matter with which the water from the Thames was stained, owing to the recent floods which prevailed during the early part of the month. Upon the cessation of the floods (which generally last for three or four days after the prevalence of heavy and continuous rains), consumers should run all the coloured water off from their cisterns, and as the river will most probably by that time have fined down and improved, the supply that will be then delivered will be clear and bright. Many of the causes of complaint as to the quality of the water delivered for domestic purposes are found on inquiry to be solely attributable to the dirty and imperfectly covered cisterns on the premises of the complainants; all cisterns should be frequently cleaned out, and every care should be taken by the consumers to prevent the contamination of the domestic water supply.

BRISTOL UNITED GAS COMPANY.

The Half-Yearly Meeting of Shareholders was held on Thursday, the 16th inst.—Mr. F. TERRELL in the chair.

The SECRETARY (Mr. Townsend) read the directors report, which was as follows:—

The accounts of the company for the half year ended June 30, 1875, now laid before you, have, in accordance with suggestions several times made at previous meetings, been for the first time printed, and a copy sent to each proprietor.

Before reference is made to any of the ordinary transactions of the company in respect to the business of the half year, the directors desire to record their sense of the great loss the company have sustained since the last meeting of proprietors by the death of their late highly esteemed chairman, Mr. William Naish, who during the long series of years in which he was a director of the company at all times rendered most energetic and valuable assistance in every matter that concerned its interests and welfare.

The directors have appointed Mr. Frederick Terrell (late deputy-chairman) as chairman in the place of Mr. Naish. They have also elected Mr. Samuel Jones, of Pembroke Road, Clifton, to fill the vacant seat at the board, caused by the death of the late Mr. T. P. Jose, for the remainder of the time that Mr. Jose (had he lived) would have occupied the seat.

The accounts for the half year show a balance of profit of £16,309 13s. 6d. This sum will admit of the payment of the full statutory dividend, and leave a balance to be carried forward of the sum of £1747 3s. 6d.

A considerable reduction has taken place in the price of coals, but the full effect of the alteration is not manifest in the accounts now presented, because the chief part of the coal in the item under that head was purchased at the higher prices, and before the reduction.

The directors have the pleasure to announce that they were enabled to reduce the price of gas from and after the 1st of July last from 4s. to 3s. 6d. per 1000 feet.

The directors, having found it necessary to make an addition to the capital of the company, sold by auction, on the 10th of June last, the sum of £20,000 stock, which realized a total amount of £37,486 10s., being an average price of nearly £187 10s. per cent.

The engineer reports the whol eof your works to be in good condition, and such alterations and enlargements as are yet incomplete are in a state of satisfactory progress.

Four of the directors—viz., Mr. Colthurst, Mr. Jones, Mr. Spark, and Mr. Wills—also one of the auditors, Mr. Thomas—retire by rotation at this meeting, and are eligible for re-election.

The directors recommend that a dividend at the rate of £10 per cent. per annum on the capital of the company entitled to dividend be declared, and made payable at the bank of Messrs. Cave, Baillie, and Co., Bristol, on and after Wednesday, the 29th of September inst., subject to the deduction of the income duty.

The CHAIRMAN moved that the report be adopted, and entered on the records of the company. The report was a very short one, and on many occasions very few words were required to convey pleasing intelligence, and, with the exception of the first gloomy paragraph relating to the loss they had sustained by the death of their late chairman, Mr. William Naish, he thought they would find the report was of a very pleasing nature. He did not like to pass over the reference to Mr. Naish, neither did he like to mention any gloomy matter before the proprietors; but he thought they would say the observations made in the report respecting their late very estimable chairman, who occupied that position for several years, and previous to that was deputy-chairman, at a time, too, when the greatest part of the work was thrust upon him, in consequence of the ill-health of Mr. G. Thomas, the then chairman, were very proper observations—that the terms in which they spoke of him showed an amount of attachment and respect to his memory which the proprieties would think justified. Passing away from that heavy cloud, he thought they would admit they had now come into the full sunshine. He did not know that he had heard for a long time a more satisfactory report as regarded their financial position, and their position in every respect. For two years following they were in a depressed state; and speaking only for himself—for he was, unfortunately, acting as chairman then—he felt very depressed to think that, on his first or his second appearance before the proprietors, he had to bring before them such a gloomy state of affairs. Now, however, they were in a bright sunlight. If they would look at the financial position of the company, the manner in which their shares sold in the market, showing the approval of the public and the confidence they had in the company, they would see that they had cause for rejoicing. He might tell them still further that their reserve-fund, from which they had drawn very largely to supply the deficiencies for the losses they had sustained, had been again filled up, and that they had been able to reduce the price of gas 6d. per 1000 feet, a promise they always fulfilled whenever there was an opportunity of doing so. They promised when that extra 6d. was put on that it should be taken off at the earliest opportunity, and it had been taken off. The directors always considered that their first duty was towards the proprietors, who, having embarked their capital in a concern of that kind, had a first claim upon them, and that the consumers of gas should follow after them. He believed that it paid them to reduce the price whenever it was practicable, the consumption was so much greater, through persons, perhaps, not being so careful when they had not so much to pay for an article, and also through the spread of houses, and the use of gas instead of coal fires. From whatever cause it arose, it was usually found that under these circumstances the consumption of gas greatly increased, and made up the deficiency which was produced by the reduction of price.

Mr. T. T. TAYLOR seconded the motion.

Mr. GILES inquired, with reference to the recent issue of stock, whether it could not have been issued as debenture stock.

The SECRETARY said they had no power to issue it as debenture stock.

In answer to another question, the SECRETARY said they had not yet issued all the stock they were entitled to issue.

The resolution was then put and carried.

The CHAIRMAN next proposed that a dividend at the rate of 10 per cent. per annum for the half year ending the 30th of June last be declared, and be made payable on the 29th of September, subject to the deduction of income-tax.

Mr. C. METIVIER seconded the motion, which was put and carried.

On the motion of the CHAIRMAN, the retiring directors were re-elected, and severally returned thanks for this renewed expression of the confidence of the proprietors.

On the motion of the CHAIRMAN, Mr. George Thomas, of the firm of Messrs. Barnard, Thomas, Tribe, and Co., was re-elected auditor of the company.

The thanks of the meeting to the chairman and directors terminated the proceedings.

DOVER GAS COMPANY.

The Half-Yearly Meeting of Shareholders was held at the Wellington Hall, Dover, on Tuesday, Sept. 7—Mr. W. R. MOWLL in the chair.

The SECRETARY (Mr. Fielding) read the notice convening the meeting, and the following reports were taken as read:—

Directors Report to the Stock and Shareholders.

Ladies and Gentlemen,—In order to raise the sum of £700, required to pay for the extensions to the works alluded to in our special report of the 12th of March, we have sold by auction 50 of the new £10 shares created by the meeting held on the 6th of April, which produced £753 12s. 6d., giving an average premium of £5 1s. 5d. per share. This result is very gratifying to us, as evidencing a public confidence in the permanent prosperity of the company.

We beg to remind you that our contract of management with Messrs. Anderson and Jones will expire on July 1, 1877. We shall continue to give this subject our best attention, so that when the proper time arrives we may be prepared to lay before you a well-considered scheme for the future conduct of your business.

We regret to have to inform you of the retirement from office of Mr. John Shipden, who has been for 24 years a director of the company.

We cannot let this occasion pass without putting on record our high opinion of the benefit the company has derived from his constant attention to the duties of his office, and the unflinching integrity and ability which has characterized the carrying out of those duties. In accordance with the requirements of the company's Acts of incorporations we elected Mr. Thomas Wickens Fry, of the Harp Hotel, a director, in the room of Mr. Shipden.

Mr. Shipden would have retired from office at this meeting; Mr. Fry therefore retires, together with Mr. E. Bottle. Both gentlemen are eligible for re-election, as is also Mr. C. K. Worsfold, who retires from the office of auditor.

The profit and loss account shows a balance of £1968 8s. 7d. This will enable you to declare the full parliamentary dividend of 7½ per cent. per annum.

The usual reports from our engineer and managers accompany.

Engineer's Report.

Gentlemen,—I beg to report that on my visit of inspection to your several works on the 18th inst., I found the whole of the buildings and manufacturing plant at your Buckland and Russell Street stations in satisfactory condition and efficient working order. The gasholders at the old works require some repairs, to which I drew the attention of your managers.

The usual resetting and repairs to retorts are being carried on, and will shortly be completed and ready for the winter's work. (Signed) T. N. KIRKHAM.

33, *John Street, Bedford Row, London, W.C.*

Managers Report.

Gentlemen,—The reduction in the cost, and the greater consumption of gas, has increased the net rentals of the company to the extent of £283 17s. 4d. for the half year as compared with Midsummer, 1874; and we have much pleasure in announcing that we have every reason to believe you will be able to reduce the net price to consumers from New Year's Day next to 4s. per 1000 feet.

The old gasholders in Trevanion Street, after having been retained in use and frequently repaired since the new works at Buckland were erected (10 years ago), are now almost worn out. They are too small to warrant the cost of re-casing them, looking at the increasing consumption of gas, and to the desirability of erecting another large gasholder at Buckland, and the sale of the site of the old gas-works.

(Signed) ANDERSON AND JONES, Managers.

Dover, Aug. 26, 1875.

The CHAIRMAN said his duty that afternoon was an exceedingly pleasant one. The directors, over whom he presided, were able to inform the shareholders that the affairs of the company had continued to prosper during the half year just ended. The profit and loss account showed a balance of £1968 8s. 7d., and thus enabled them to declare the full parliamentary dividend at the rate of 7½ per cent. There was one clause in the report which he thought deserved special reference; it was the one referring to the retirement from the directorate of Mr. John Shipden, after occupying that position for no less than 24 years. It had been his happy privilege for some years past to be associated with Mr. Shipden in the conduct of such of the affairs of the company as came before the directors, and he believed he was speaking the language of truth when he said that never, during the whole of the time he had sat at the board, had they been required to divide on any question. After calmly and fully discussing a matter they had always in the end been of one mind as to the manner of dealing with it. This was owing, he considered, in no small degree to the action of Mr. Shipden, who brought to bear his great experience and high feeling of rectitude upon every question before the board. He and his colleagues greatly regretted his retirement, and could only express a hope that the gentleman they had elected in his place, Mr. Thomas Wickens Fry, would display the same amount of ability in dealing with the affairs of the company, the same integrity and singleness of purpose that characterized Mr. Shipden. As chairman, he naturally found a considerable amount of satisfaction at seeing the high price obtained for the shares recently submitted to public auction. They offered for sale 50 £10 shares, and, such was the desire of the inhabitants to invest in the company, they realized £753 12s. 6d., rather more than 50 per cent. above par. So if any shareholders wished to calculate what they were worth, they should reckon their shares not at their value at par, but at 50 per cent. premium. With these observations, he would move the following resolution:—"That the report of the directors read be received and approved, and that a dividend at the rate of 7½ per cent. be declared."

Mr. EDWARD BOTTLE seconded the motion, and said he could quite corroborate what the chairman had said concerning Mr. Shipden. That gentleman attended at nearly every meeting, and displayed a conscientious regard for the interests of the shareholders.

The motion was then put, and carried unanimously.

The CHAIRMAN said Mr. T. W. Fry and Mr. Edward Bottle were the retiring directors, and, as they were eligible, he had great pleasure in moving their re-election.

Mr. WORSFOLD having seconded the motion, it was carried.

Mr. R. H. JONES proposed the re-election of Mr. Worsfold as auditor, remarking that no one in the town was better fitted for the post.

The motion was seconded and carried.

The CHAIRMAN said he was happy to say there was no other business. When Englishmen got all they expected to receive, they were always satisfied.

Mr. JONES proposed a vote of thanks to the chairman, the directors, and Mr. Fielding, the secretary. Perhaps no one had more opportunities of seeing the admirable manner in which they carried out their duties, and he could assure

the shareholders that it would be impossible to secure the services of gentlemen more alive to the interests of the company.

The CHAIRMAN, in reply, said he was grateful for the compliment that had been paid to him and his brother directors. His colleague, Mr. Bottle, had just reminded him that he had omitted to mention the fact that on the 1st of January next the price of gas would be reduced to 4s. per 1000 net, the price paid in neighbouring towns. It was the desire of the directors to give the public gas at the lowest price possible, after provision had been made for the payment of dividend on the capital invested.

Mr. FIELDING said he was pleased to be included in the vote, as on former occasions, and being assured of the approbation of the shareholders, it afforded him great gratification to attend at these meetings. He tried to advance their interests in the carrying out of his duties, and he did not think he entirely failed.

The proceedings then terminated.

The *Dover Chronicle* says: "We understand that Messrs. Anderson and Jones have proposed a reduction in the price of gas to private consumers to 3s. 10d. per 1000 on the 1st of January next, conditional on their being provided with the necessary purifiers to remove the unavoidable nuisance arising from want of a sufficient number of purifying vessels, and also on their re-engagement as managers of the company's works on a yearly tenancy."

BIRMINGHAM AND STAFFORDSHIRE GASLIGHT COMPANY.

The Half-Yearly General Meeting of this Company will be held on Tuesday, the 28th inst. The notice convening the meeting states that—

"At the close of the ordinary business, resolutions will be submitted, and, if considered advisable, adopted, for giving the directors power to do all acts and to make all arrangements necessary or expedient for the final settlement of accounts and completion of the sale of the company's undertaking to the corporation on the 1st of January next, including a power to admit the corporation to participate in the management of the business, and to take to its earnings subsequent to the 30th of June last, and to all outstanding debts, on such terms in all respects as to the directors may seem fit."

The following is the report of the directors for the half year ending June 30, 1875:—

Your directors have the pleasure of submitting the profit and loss account, which shows a balance in your favour of £40,871 3s. 6d. Out of this sum they recommend the payment of the maximum dividends, amounting to £29,145, leaving a balance of £11,726 3s. 6d. to the credit of next half year's account.

The erection of the new gasholder at Saltley is being rapidly proceeded with, and it is hoped will be ready for use during the coming winter.

The Act for confirming the sale of the company's undertaking received the Royal Assent on the 2nd of August last, and it is proposed to complete the purchase on the 1st of January next. Negotiations are now pending for the purpose of enabling the company and the corporation to effect a complete settlement of the business on that day, and your directors propose to ask the general meeting for the necessary authority to carry out any arrangement that may be made.

The directors who retire by rotation at this meeting are Messrs. Sharp, Blakeway, Gibbins, and Goodman, all of whom are eligible, and offer themselves for re-election.

Dr. *Profit and Loss Account, June 30, 1875.* *Cr.*

Coals	£81,749	2	11	Balance brought from last half year's account	£46,451	13	9
Purifying materials and process	837	3	0	Gas, after deducting £6000 for estimated discounts, bad debts, and cost of collection	115,771	15	4
Repairs & maintenance of meters, mains, service-pipes, and other works	11,499	19	2	Coke and breeze	31,074	1	3
Wages	14,604	15	0	Tar and other residuals, and fittings	16,846	12	0
Lamps (providing, lighting, extinguishing, cleaning, and repairing)	1,397	14	10	Rents	186	19	10
Rates and taxes	5,009	0	10				
Salaries, collectors' commission, and payments to directors	6,248	14	7				
Interest on loans	451	14	1				
Professional charges and incidental expenses	1,130	9	2				
Amount carried to reserve-fund	18,244	3	9				
Divds. paid to proprietors, viz.—10 per cent. per an. on £320,400, capital raised under Act of 8 & 9 Vict., cap. 66	16,020	0	0				
7½ per cent. per an. on £325,000 for six months, raised under Act of 21 Vict., cap. 1	12,187	10	0				
Miscellaneous	79	11	4				
Balance carried to next half year's account	40,871	3	6				
	£210,331	2	2		£210,331	2	2

Balance-Sheet, June 30, 1875.

Capital raised under Act 8 & 9 Vict., cap. 66	£320,400	0	0	Cost of works, Dec. 31. 1874	£639,221	13	9
Ditto, Vict. 21. cap. 1	350,000	0	0	Add extensions made during the half year	9,255	6	2
Ditto, Vict. 27 & 28, not bearing dividend	10,906	0	0	Amount invested of the reserve-fund	20,891	16	6
Amount of loans	22,775	0	0				
Reserve-fund	39,609	11	8				
Amount owing by the company (The expenses incident to the promotion of the company's bill, and to the transfer to the corporation, are not yet ascertained.)	21,669	17	3	Amount owing to the company for gas, cokes, residual products, fittings, &c. (exclusive of estimated discounts, bad debts, and cost of collection)	80,945	14	2
Unclaimed dividends	302	17	1	Coals in stock	20,054	16	9
Balance, as above	40,871	3	6	Residual products and other stock	9,651	0	9
				Cash in hands of treasurer and cashier	26,514	1	5
	£806,534	9	6		£806,534	9	6

BOURNEMOUTH GAS AND WATER COMPANY.

The Annual Meeting of Shareholders was held at the Offices, 30, Nicholas Lane, London, on the 13th ult.—Major SUART in the chair.

The SECRETARY (Mr. W. Cash) having read the notice of meeting, the following report was submitted:—

The directors again congratulate the shareholders on the satisfactory report which they are able to present on the working of the company during the twelve months ending the 30th of June last.

The rental accounts show an increase of £2455 16s. 5d. over those of the previous year, and the increase in the net profit is £742 9s. 9d.

The works which were in progress when the last report was presented have been completed, but the directors found that a much larger expenditure must be incurred, so rapid has been the increased demand both for gas and water, which has involved, to a large extent, the reconstruction and rearrangement of the gas-works and additions to the water-works, and they are all now being carried out in an effective manner.

The water tower at Boscombe is in operation, and is found to be of great service in supplying the higher parts of the town, and a well has been sunk, from which the directors confidently expect they will obtain such a quantity of water as will enable them to meet all the legitimate requirements of the consumers.

The directors have issued mortgage debentures to the full amount sanctioned at the last meeting, and permitted by our Act of Parliament; but £6000 do not appear in these accounts, having been received since the 30th of June.

To obtain the additional capital for the works now in progress, and required, the directors will ask the shareholders at an extraordinary meeting, to be held after the close of the ordinary meeting, to pass a resolution, giving them power to raise further capital by the issue of new ordinary shares or stock (which, according to our Act, is limited to a dividend of 7 per cent. per annum), and will be offered to the present shareholders rateably, according to their several holdings.

The directors recommend that a dividend of 5 per cent. be paid for the past six months, making, with the interim dividend paid in February last, 9 per cent. for the year.

Two of the directors, Major Suart and Mr. G. F. Whiteley, retire from the board by rotation at this time, and Mr. Walduck, your auditor, also retires; but, being eligible, these gentlemen all offer themselves for re-election.

The Profit and Loss Account for the year showed receipts for gas, meter, and lamp rental, £8163; water and meter rental, £4168; residual products, £937; interest, rents, and transfer fees, £143; balance from 1874, £1316—total, £14,728. On the other side: cost of coals, £4069; purifying materials, £106; wages and commission, £1548; working charges, £1367. London expenses—directors, secretary, auditor, &c., £846; meters, depreciation, £155; rents payable, £67; leaving a net profit on the year of £5138, which, added to the amount brought forward from last year, left a balance of £6454 available for dividend.

The CHAIRMAN, in moving the adoption of the report, congratulated the proprietors on the position of the company; and with reference to the second paragraph, he remarked that, though no doubt from an accountant's point of view the accounts showed an increase of £742, it was really £984. The additional works that they were engaged on, though, of course, causing an increased expenditure, were necessary, seeing how rapidly the rentals increased, and no doubt would increase; and he felt every confidence that the company would be enabled to supply the wants of the inhabitants. The water supply had been much improved, and a well had been constructed with most satisfactory results. It had been dug through strata and three or four beds of clay, and in the opinion of the engineer the supply would be good and ample, and it had been thoroughly able to bear the test that it had been subjected to. With reference to the gas department, it had been necessary to erect a third holder, as one of the others was found to leak at the beginning of this year, and had continued to do so, though latterly there had been somewhat of an improvement. They had laid down many miles of main, and this no doubt would produce revenue. Negotiations had resulted in the company supplying Dr. Compton's estate, and that gentleman guaranteed 5 per cent. on the outlay, and that would continue until the company got 10 per cent. from himself and the other customers. The water tower at Boscombe had been completed, and was at work, and now there were no complaints as to the higher services in the town. There had been negotiations with the commissioners, and an average meter supply was asked for; but as yet no arrangement had been come to. Increased capital would be wanted, but he anticipated that the returns would exceed last year by £1509 to £1600. One of the drawbacks they had to contend with was the residual products; they certainly did not obtain the price for the coke that they ought. No doubt a larger revenue from this source would be obtained if the place was more convenient to get at. The company had 2100 meters, and they allowed for the depreciation 10 per cent. As to the staff, they had every reason to be satisfied with their officers.

Mr. HUDSON seconded the motion.

The CHAIRMAN, in reply to a shareholder, said negotiations for the supply of a part of Poole were still pending, and no arrangement would be entered into by the directors unless there was a prospect of a satisfactory return.

Mr. MEAD expressed some dissatisfaction as the result of a visit paid by him to the works last year. He was gratified with the progress of the rental, and believed that, under proper management, the company would continue to be a prosperous undertaking.

The report was then adopted, and a resolution passed, declaring the dividend recommended by the directors. The retiring directors and auditor were also re-elected.

The meeting having been made special, a resolution was carried authorizing the issue of ordinary shares to the amount of £20,000, 2000 at £10 each, to be issued, in the first instance, to shareholders at par, at the rate of one new share to three old shares, and providing that, if the whole were not taken up, the remainder to be disposed of by the directors as they may think best in the interest of the company.

A vote of thanks to the chairman concluded the proceedings.

LEWES WATER-WORKS COMPANY.

The Annual Meeting of Shareholders was held on Monday, Sept. 13—Mr. E MORRIS in the chair.

The SECRETARY (Mr. H. Jones) read the following report of the directors:—

The accounts of the year to Midsummer, 1875, having been audited, the directors beg to forward an abstract of such accounts to the shareholders.

It will be seen that the revenue for the year amounted to	£2096	10	10
Whilst the disbursements, including the deductions for irrecoverable rents and empty houses, were	1167	5	8
Leaving for appropriation	£929	5	2

After payment of the preferential dividend at £5 per cent. to the preference stockholders, there will remain a sum of £809 5s. 2d., which will permit a dividend at £7 per cent. to be paid to the ordinary shareholders, which the directors recommend should be declared, and will leave a sum of £53 5s. 2d. to be carried to the reserve-fund account, which will then amount to £256 4s. 3d.

The past year, which has been eventful, not only to the town generally, but also to the company, has been one of deep anxiety to the directors. The shareholders are doubtless aware that Dr. Thorne Thorne, in his report to the Local Government Board, considered that the company's water might have been accidentally polluted, and the directors at once ordered their manager to keep on a constant service of water both night and day; this order has been continued and acted upon, and other means adopted, by ventilation of mains and otherwise, for keeping the water thoroughly pure in transit to the renters. The directors also consulted Mr. Edward Easton (of the firm of Easton and Anderson, the eminent hydraulic engineers), who was well acquainted with the company's works, as to the best means of obtaining a good and sufficient supply of water to be pumped direct from the springs without any possibility of pollution.

Under the advice of Mr. Easton a well was sunk on the company's land close to the works, and after many difficulties excellent water of the purest possible quality was obtained at a depth of 140 feet, and estimated to be sufficient in quantity to supply the town even if it doubled its population. Although the works are not quite completed, the town has been entirely supplied with water from the new well for the last two months.

The directors cannot but congratulate the shareholders on the successful issue of this highly important work. The keeping on the constant supply entails a somewhat heavy expense, but the directors are of opinion, in which they believe the shareholders will concur, that such is well compensated by the confidence given to the renters that every precaution is taken to supply them with pure and wholesome water.

The cost of sinking the well and of the works in connexion therewith will be defrayed from the sum to be raised by the call which at the last annual meeting the directors were empowered to make.

The directors believe, on account of the closing of many wells in Lewes, and from various other causes, that the number of renters will now much increase, and, therefore, that it will be advisable in several districts to lay down fresh mains as well as to replace old mains by others of a larger size, and they consider that at the annual meeting about to be held it will be necessary to make a further call of not exceeding £3 in respect of each of the new shares which were created at the meeting of the shareholders held on the 5th of October, 1868, which, with the call authorized at the annual meeting held on the 16th of September, 1874, but which has not yet been made, will amount to a sum not exceeding £5 per each such new share.

The CHAIRMAN moved the adoption of the report, remarking briefly on its importance, not only in the interests of the shareholders, but also with reference to the town.

Mr. CROSSKEY seconded the motion.

Mr. BROAD, having put and received replies to several questions, said he felt strongly what had taken place during an eventful year, as the directors described it in the report; and, as this was the only time the shareholders had

for seeking explanation as to the prosperity or retrogression of the company, he thought it well on their part, and on behalf of the renters, to inquire as to what had been done during the past year, and with that object he should like to have the minutes of the whole year read, to see what had been done at the various meetings of the directors. From last year's report they learned that the machinery was in good working order, but the same could not be said of the pipes; and therefore it was proposed, as considerable difficulty was experienced in affording a proper supply, owing to the smallness of the mains, that a call should be made on the shareholders, in order that new mains should be laid down, and larger ones substituted for those which were found to be insufficient to afford a proper supply. That being so, he should like the minutes produced, to show what had been done in relaying mains and in substituting new ones for old. In 1874 they were short of water; it was known to the directors at the time, and they thought apparently by increasing their mains there would be a better supply to various parts of the town. But there was another question involved in this—as to the water supply itself; and he should like to ask the directors whether, when the water was short, they took means to instruct their manager where to get additional water from, or whether, of his own accord, he pumped water into the works from the Cockshoot stream. This was a vital question, and should be replied to for the sake of the renters and the water company itself, so that the public should have some assurance given them, and their confidence be regained, that such a thing should not occur again. He had not heard that any mains had been relaid or substituted for the old ones since 1874.

The CHAIRMAN said it would take a great deal of time to read all the minutes; but if there was any particular point he wished explained, it would be a different matter.

Mr. BROAD thought it would give the public confidence, if the minutes were read, that everything had been done by the directors which could be done. Last year it was proposed that the mains should be relaid. Had that been done?

Mr. LENNY said, with regard to Mr. Broad's question, it should be remembered that when it was proposed last year to lay down new mains, they had only a seven hours, instead of a constant service, and, therefore, some of the smaller mains were found to be insufficient to supply the town; but now, with a 24 hours service, they were enabled fully to supply the town with these small mains. He had means of knowing that the shareholders were satisfied with the conduct of the directors, and hoped that those retiring would be reappointed.

The CHAIRMAN said he thought it would facilitate a satisfactory solution if he stated that the directors appointed what was called a Works Committee, who had carefully attended to all the matters to which Mr. Broad had alluded. Mr. Crosskey was a very active member of that committee, and he (the chairman) would call upon him to explain.

Mr. CROSSKEY said he was sure he was speaking the feelings of the directors when he said that if Mr. Broad wished it they would be much pleased for the whole of last year's minutes to be read, and fully and fairly reported. It would, however, take a very long time, if the meeting looked at the weekly—he might almost say daily—meetings of the Works Committee, in endeavouring to carry out what they believed to be the proper measures in preventing danger arising from any pollution of the water. He would not go into the question of how, when, or where their water was polluted; but he would say that if the shareholders were satisfied with what they had done, it would perhaps be unnecessary to wade through all the minutes, and only to give the results. The first question asked by Mr. Broad had been answered by Mr. Lenny, with respect to the relaying of mains and pipes, and the shortness of supply had not been felt since the constant service had been put on. He believed that all the company's renters, in every part of the town, excepting, perhaps, those at the extreme height on the Wallands, had the advantage of the full service, and had as much water as they required at any time of the day or night since the constant service had been in existence. This was his answer with respect to the relaying of mains. The directors had so much upon them in the autumn, in consequence of the particular circumstances of the case, that they thought it advisable to leave that work until they obtained first what they so much required—a pure supply of water pumped direct to the renters in abundance. In this they had been fully successful, and they had now a perfect supply. He would say at once that the directors assumed that it was necessary for them to carry out what the public required, and he thought that had been done. He was quite sure he was speaking within bounds when he stated that the water had not once been turned off during the present year, except for one or two hours at a time, when it was absolutely necessary to do so, in order to obtain a supply where it was not hitherto in existence. That portion of the agreement, because it was a tacit agreement between the directors and the public, had been carried out; and he could only say, for he felt very strongly on the subject, that he should not consent to be on the board of directors, and should resign, if the constant service was not continued. He felt that this was a vital question in water-works management. Then, again, it was found that there were several accumulations, or what are called "dead ends," at the ends of the pipes. The Works Committee had power to alter these without going to the directors; in fact, power was given them to do what they considered necessary. In some cases, where mains went through sewers, the committee were empowered to effect a remedy; so that if the minutes of the directors meetings were read, all that had been done by the Works Committee would hardly be obtained. He confessed that sometimes the Works Committee had been a little irregular in their orders, in consequence of things being ordered to be carried out without the matter coming before the board of directors; but they felt that the important circumstances of the case justified them in departing from their ordinary course of business. Had it not been for the many expenses incurred in carrying out the various works, the shareholders would have had a larger dividend than on the present occasion. It was a very difficult matter to find out an evil, and get rid of it at once; and he must say that, during the last year, whatever evil the directors had discovered they had administered a remedy as soon as possible. He had seen Mr. Braden, who had just analyzed the new water, which he reported was perfectly pure, whilst Mr. Easton said the well was capable of supplying a town double the size, and he (Mr. Crosskey) thought that in every way the company had carried out what possibly could be done in order to render the water pure. The directors believed there would be a great extension of mains required in parts where they had not hitherto been in use. As business men, they had gone to work in a business-like manner, and done what the public demanded. They had not even looked to the money question; and when, in some instances, they had not had time to ascertain the cost, they had done the work at once.

In reply to Mr. Broad, Mr. CROSSKEY stated that the first contract for the new works was £500, which was for a well only 56 feet deep, and then the order was given to the contractor to go on until they could get a sufficient supply.

Mr. BROAD expressed himself satisfied with Mr. Crosskey's explanation, and thought it would do good by publicity being given to the matter.

The CHAIRMAN, in reference to Mr. Crosskey's observation respecting the amount of dividend, said he (Mr. Morris) spoke with some degree of confidence when he said that he expected the company would pay not only 5 per cent. upon the preferential stock, but 7 per cent. upon the new shares.

Mr. J. L. PARSONS was quite content with a dividend of 7 per cent.

The CHAIRMAN: You would rather have more?

Mr. PARSONS replied in the negative, and said he thought the town should have the advantage of any increase in the revenue in some other way. He thought it was time the town should purchase the works.

Mr. LENNY expressed a similar opinion.

Mr. CROSSKEY: This is not the proper meeting for discussing this question; but I quite agree that the town ought to supply water and get the advantage of the profits arising therefrom, for the reduction of taxation.

The motion for the adoption of the report was then carried unanimously.

Mr. BROAD moved, and Mr. C. PARSONS seconded, that a dividend of 5 per cent. on the preference stock and 7 per cent. in respect to the ordinary shares be declared.

The motion having been carried,

Mr. WATSON moved, and Mr. C. PARSONS seconded, a vote of thanks to the directors for their valuable services during the past year. The latter stated that he had watched with great interest what had been going on at the company's works during the last eight or nine months, and was very glad that the new well and boring had been carried out so successfully. He believed they had now a supply sufficient for a town of 30,000 inhabitants. The directors had displayed remarkable energy, and every effort had been made to supply the renters with water free from pollution. He considered they had bright prospects for the future.

The motion having been adopted,

The CHAIRMAN acknowledged the compliment paid to him and his colleagues. As the report stated, it had been a year of anxiety to them, and he thought the shareholders outside had but an imperfect opinion of what that anxiety had been. Night and day, for weeks together, they had their minds oppressed with the position the company found itself in. He did not wish unnecessarily to refer to Dr. Thorne's report, but it created intense anxiety in the town, and to a certain extent was taken advantage of by other people to reflect unjustly on the directors and the supply of water to the town. Dr. Thorne positively stated that their water supply was contaminated by water from the Ouse getting into their source of supply, but he (the chairman) believed if they took ten independent and intelligent men, with a fair share of common sense, who knew the facts of the case, nine out of the ten, if not the whole of them, would not endorse Dr. Thorne's conclusions. He (the chairman) believed it to be impossible, according to the laws of nature, and the rules of reason and gravity, for their water to have been contaminated by water from the Ouse. If ever it had been, the circumstance could only be accounted for by supposing that some amphibious demon—if ever there was such a thing—must have waited at the sewer outlet, gorged the unpleasant matter which it was said had done the mischief, swum with it a mile down the river, then a mile up the Cockshoot stream, where some one must have been in readiness to open the sluice for him, and ultimately, by some supernatural agency, he must have vomited it into the source of their supply. He could not see it possible that the water could have been polluted in any other way according to the laws of nature and gravity. At the time to which he alluded some of the remarks made were quite of a personal character, and but for the affliction from which many had suffered, he should never have allowed them to pass unnoticed. The directors had more sympathy for other people than other people had for the directors.

A call on the new shares, of £3 each, according to the recommendation of the report, was then made, and the retiring directors were re-elected.

After some discussion respecting the vacancy at the board, caused by the resignation of Mr. Farnes, the proceedings closed with a vote of thanks to the chairman.

BIRMINGHAM WATER-WORKS COMPANY.

The Half-Yearly Meeting of Shareholders was held on Wednesday, the 15th inst.—Mr. G. HEATON in the chair.

The following report was presented:—

The directors have to report that the water-rental for the last half year amounted to £43,028 3s. 2d., exceeding that of the corresponding half year of 1874 by £1592 9s. 3d., and that of the half year ending Dec. 31 last by £225 18s. 11d.; the water-rental for the year ending June 30, 1875, exceeding that of the year ending June 30, 1874, by £4574 12s. 3d.

The profit of the past half year is £25,337 19s. 9d., being more than that of the corresponding half year of 1874 by £2897 12s. 7d., and more than that of the half year ending Dec. 31 last by £38 17s. 10d., the total profit of the year ending June 30, 1875, being more than that of the year ending June 30, 1874, by the sum of £3903 11s. 6d.

The profit and loss account for the half year ending June 30, 1875, and the balance-sheet of that date are now submitted to you.

The profit of the past half year—viz., £25,337 19s. 9d.—and the previous undivided profit—viz., £90 14s. 9d.—make a total of £25,428 14s. 6d. The directors recommend that a dividend at the rate of 8 per cent. per annum upon the paid-up capital comprised in the original £25 shares, the new £25 shares A, and the £18 15s. shares B; and a dividend at the rate of 7 per cent. per annum upon the paid-up capital of the £20 shares C, and the £15 shares D, be this day declared; which dividends will amount to £24,265 14s. 1d., leaving a balance of £1163 0s. 5d.

The directors recommend that the dividends be paid by dividend warrants, to be forwarded to the shareholders on the 23rd inst.

The whole of the pumping establishments are in good condition, and the wells at Aston, Short Heath, and Perry, continue to yield an ample supply of excellent water. The second engine and engine-house at the Aston well, will soon be completed. The filter-beds at Plant's Brook are in an advanced state. The sinking at Selly Oak is being carried on as fast as possible, and gives favourable indications of an ample supply of good water. The high-level reservoir at Erdington, referred to in the directors last report, is being satisfactorily proceeded with.

During the past half year 24 fires have occurred within the company's district, and in all cases there has been an abundant supply of water. All these fires have been extinguished without the use of fire-engines, partly by portable engines, and partly by water delivered under pressure from the company's mains; and three have been on premises not supplied with water by the company. The supply of water in cases of fire, is always provided by the company gratuitously.

After enumerating the streets and roads in which extensions of mains had taken place during the half year, the report proceeds:—

It is with deep regret that the directors refer to the loss which you and they have alike sustained in the death of their late chairman, Mr. William James, who was for many years an able promoter and faithful guardian of the interests of this company.

Mr. George Heaton has been appointed chairman of the directors.

Notwithstanding the opposition offered by the directors to the bill promoted by the Birmingham Corporation for the compulsory acquisition of the water-works undertaking, that bill has, with certain modifications, become law, and the corporation is now empowered to purchase your undertaking, either by agreement or by arbitration, under the Lands Clauses Consolidation Act, 1845. In the opinion of the directors the provisions of this Act will adequately protect the interests of the company.

The directors will give their anxious attention to any measures which the corporation may take with reference to the acquisition of the property of the company.

Dr. *Profit and Loss for the Half Year ending June 30, 1875.* *Cr.*

Wages current	£948	5	10	Water-rents	£43,028	5 2
Salaries	1,947	0	9	Rent of land and cottages	344	10 1
Working engines and wages	7,186	4	3	Fittings account	725	16 11
Repairs of works	1,721	1	5	Transfer fees	6	2 6
Coals for offices	22	6	3	Law charges recovered	130	4 0
Rates and taxes	1,868	6	10			
Interest	3,642	13	5			
Incidental expenses	248	7	10			
Law charges	57	6	1			
Abatements and bad debts	746	15	9			
Remuneration of directors	450	0	0			
Remuneration of auditors and accountant's charges	58	17	6			
Balance, being profit from Dec. 31, 1874	25,337	19	9			
	£44,235	5	5		£44,235	5 5

Balance-Sheet, June 30, 1875.

Proprietors, 4800 shares, at £25 per share			£120,000	0	0	
Do., 4800 new shrs. A, £25 per share called	£120,000	0	0			
Less calls unpaid	25	0	0			
			119,975	0	0	
Do., 9600 new shares, B, £18 15s. per share			180,000	0	0	
Do., 9600 new shrs., C, £13 per share called	£124,800	0	0			
Less calls unpaid	296	0	0			
			124,504	0	0	
Do., 9600 new shrs., D, £9 15s. per share called	£93,600	0	0			
Less calls unpaid	328	10	0			
			93,271	10	0	
Amount due on loan and interest			192,790	6	5	
Do. due to sundry persons			6,307	15	2	
Do. due for arrears of dividend			39	8	11	
Capital not bearing interest or dividend			3,022	1	6	
Fund for repairs and contingencies, and for bad and doubtful debts			2,964	14	2	
Balance profit, Dec. 31, 1874	£26,227	0	10			
Less dividend declared, March 17, 1875, at the rate of 8 per cent. and 7 per cent. per annum	23,772	6	9			
	£2,454	14	1			
Less dividend declared, March 17, 1875, to make up the dividend for the half year ending June 30, 1865, to the maximum dividend	2,363	19	4			
			90	14	9	
Profit, Dec. 31, 1874, to June 30, 1875			25,337	19	9	
			£868,303	10	8	

Works, engines, machinery, and land			£305,927	8	0	
Water-rents due from sundry persons			43,875	15	0	
Amts. due from bankers and sundry persons			14,703	2	4	
Stock of pipes, lead, coal, hemp, and repairing materials			3,792	15	4	
Cash in hand			4	10	0	
			£868,303	10	8	

The CHAIRMAN moved the adoption of the report. In doing so he referred with expressions of regret to the loss the company had sustained by the death of Mr. William James. That gentleman, he said, had for some years occupied the position of chairman of the company, and they knew in how great a degree he had promoted the interests of the shareholders and of the public. He always considered the two interests identical, believing that by serving the public well he should best be promoting the interests of the shareholders. Upon the report he had very little to say. The most important thing connected with the report was the question of the bill which had been promoted by the corporation for the acquisition of the company's undertaking, and the opposition which they felt in duty bound to offer to it. In reference to those proceedings, he might say that the directors did their utmost to prevent compulsory power being acquired by the corporation. They, however, were not successful; but they did the very best next thing, by making arrangements for arbitration under the Lands Clauses Consolidation Act, and assessing the value of the company's undertaking. The corporation at present had not made any formal offer, although some proposals of an informal character had been made to the directors. Under these circumstances, the directors asked the shareholders to have the same confidence in them which they were pleased to bestow at the last meeting. It was not the desire of the company that unnecessary and needless expense should be entailed upon the corporation under the Act. All they had to do was to meet the corporation, if they were so disposed, and treat them in an equitable and fair manner.

Mr. COLDECOTT seconded the resolution, which was unanimously carried.

Mr. RAWLINGS moved, and Mr. E. BARNETT seconded, that the acts and proceedings of the board of directors, since the last general meeting, be approved and confirmed. The resolution was unanimously carried.

The CHAIRMAN then moved, and Mr. HILL seconded, that the dividend for the last half year at the rate of 8 per cent. per annum upon the paid-up capital, comprised in the original £28 shares, the new £25 shares A, and the £18 15s. shares B, and a dividend at the rate of 7 per cent. upon the paid-up capital of the £20 shares C and £15 shares D be this day declared, less the property-tax, and that the dividend warrants be forwarded to the shareholders by the 23rd inst.

The resolution was unanimously carried.

Mr. EDMUNDS, in moving a vote of thanks to the chairman and the members of the board of directors, said the shareholders were very much indebted to the directors for the attention they had paid to the business of the company, especially their negotiations with the corporation. They had done the business of the company with great care, and during the past six months had spent much time in the interests of the shareholders.

Mr. BARNETT seconded the vote of thanks, which was unanimously carried and acknowledged by the chairman.

FENTON (STAFFS) GAS SUPPLY.—At the monthy meeting of the Fenton Local Board, on the 7th inst. Mr. Sparkes, gas examiner, reported that in consequence of part of the testing apparatus requiring repairs, he was unable for a few weeks to make any observation. Since the 21st ult. the average illuminating power of the gas had been equal to 14·21 candles, and the average amount of sulphur 18·12 grains per 100 cubic feet. No sulphuretted hydrogen had been present. The contract of the Stoke Gas Company for lighting the public lamps at Fenton was submitted. The terms were—for supplying gas and cleaning and repairing the lamps, £3 for the ordinary lamps, and £5 10s. 6d. for the large lamps, the lighting to be 10 months in the year. Mr. Skerratt said he understood there was a feeling expressed by the members of the board in favour of having gas-works of their own. That seemed to be the general feeling amongst the local governing bodies of the country. He was in favour of this township having its own gas-works. The chairman pointed out that without the consent of the gas company the board could not take steps to light the township themselves. To enter upon a contest with the gas company over the matter would involve very heavy expense. If the district were not lighted at all it would be a very different thing, but if they must succeed in getting sanction and the establishment of gas-works of their own, they would have to show very good grounds why the existing gas company which supplied Fenton should be dispossessed of their power. Mr. Minks spoke of the monopoly which the gas company enjoyed, and which the chairman admitted did exist, but it could not be helped under the circumstances. Mr. Birks complained of the unsatisfactory way the lighting was done, and said that if the tender of the company were accepted, there certainly should be a representation made to the gas company, to the effect that the board would expect that the lighting should be better done. The tender was then accepted, and it was decided to act upon the suggestion Mr. Birks had made.

BOLTON CORPORATION GAS-WORKS.

BALANCE-SHEET OF THE CORPORATION GAS DEPARTMENT, FROM JULY 1, 1874, TO JUNE 30, 1875.

Dr. *Capital Account.* *Cr.*

June 30, 1874—								
Amount expended on the works to this date				£245,572	8	9		
June 30, 1875—							June 30, 1875—	
Amount expended this year—								
Mains	£1,877	14	1					
Gas-tank	1,032	11	6					
General expenses	35	0	0					
Apparatus	12	12	0					
Gasholder	3,718	17	10					
Hired meters	1,555	0	2					
	£8,231	15	7					
Cr.—Old metal sold	201	3	1					
				8,030	12	6		
				£253,603	1	3	Balance carried down	£253,603 1 3
Balance brought down				£253,603	1	3		

Revenue Account.—Dr.

	Year ending June 30, 1875.	Year ending June 30, 1874.
To Cannel and coal consumed	£41,351 0 2	£36,529 11 10
Wages for gas manufacture	5,054 8 2	4,617 4 10
Lime and purifying	1,594 13 4	1,629 3 11
Retorts, materials, and labour	1,381 14 4	1,641 3 2
Repairs of iron and brick work	3,107 13 4	5,069 14 6
Water	160 2 8	315 19 4
General expenses	146 19 6	110 16 7
Salaries	2,597 15 6	2,539 7 10
Rates and taxes	1,232 19 9	1,315 4 10
Chief rent	153 19 6	152 18 10
Office expenses, stationery, and printing	494 2 3	407 10 0
Law charges	84 5 6	30 16 6
Bank interest and commission	490 13 11	283 17 3
Bad debts	320 4 5	195 19 9
Meters and fittings	5,627 3 0	6,521 6 9
	£63,797 15 4	£61,380 15 11
Annuities	14,469 5 0	14,460 4 8
Interest on loans	2,094 8 1	1,154 11 3
	£80,352 8 5	£76,995 11 10
Balance carried to reserve-fund account	6,272 12 5	4,033 7 3
	£86,625 0 10	£81,028 19 1

Revenue Account.—Cr.

	Year ending June 30, 1875.	Year ending June 30, 1874.
By Gas-rental	£66,708 6 2	£59,582 8 6
Meter-rents	624 17 1	507 6 0
Meters and fittings	6,959 7 3	7,846 7 9
Coke	5,831 14 7	7,981 17 5
Tar	3,420 16 3	2,205 8 3
Spent lime	187 8 11	217 17 9
Ammoniacal salts and liquor	2,640 2 5	2,443 19 9
Rents	231 8 6	177 12 6
Sundries	14 4 8	60 16 8
Transfer fees	6 15 0	5 5 0
	£86,625 0 10	£81,028 19 1

Dr. *Renewal-Fund Account.* *Cr.*

June 30, 1875—				June 30, 1874—		
Expenditure for the year	£1,329	2	8	Balance at this date	£6,285	11 7
Balance carried down	7,985	13	11	June 30, 1875—		
				Sales	29	5 0
				Transfer from reserve-fund account	3,000	0 0
	£9,314	16	7		£9,314	16 7
				Balance brought down	£7,985	13 11

Reserve-Fund Account.

				June 30, 1874—		
				Balance at this date	£1,002	3 6
June 30, 1875—				June 30, 1875—		
Renewal-fund	£3,000	0	0	Balance from revenue account	6,272	12 5
Borough-fund	3,000	0	0			
Sinking-fund	696	0	0			
Balance carried down	578	15	11			
	£7,274	15	11		£7,274	15 11
				Balance brought down	£578	15 11

Sinking-Fund Account.

June 30, 1875—	
Transfer from reserve-fund account	£696 0 0

Proof Balances.

ASSETS.				LIABILITIES.			
Capital account	£253,603	1	3	Stock account (shareholders capital and gas company's reserved fund)	£205,947	10	1
Amount owing to Gas Committee	12,954	17	10	Loans account	55,722	0	0
Stock of cannel and coal	2,620	6	0	Renewal-fund account	7,985	13	11
,, coke	1,200	0	0	Reserve ,, ,,	578	15	11
,, chemicals	248	10	0	Sinking ,, ,,	696	0	0
,, meters and fittings	3,896	14	4	Deposit account	4,223	1	0
Bank balance	15,272	10	10	Amount owing by Gas Committee	3,520	3	1
Cash balance	290	7	6	Half year's annuities	7,230	5	4
				Ditto interest on loans	1,182	18	5
				Borough-fund	3,000	0	0
	£290,086	7	9		£290,086	7	9

CARLISLE CORPORATION GAS AND WATER ACCOUNTS.—At the council meeting, on Tuesday, the 14th inst., Mr. Hepworth submitted a statement of these accounts for the year just ended. In the gas-works account the capital account shows an expenditure in gas-mains and other apparatus of £1153, making the total capital expended (less depreciation) £34,331. The profit and loss account shows receipts from gas, £14,039; coke, &c., £5053; fittings, &c., £5125. The net balance, being profit, is £3305. The liabilities are £13,525 and assets £58,652. Balance of assets, in excess of liabilities, £45,127. In the water-works accounts the amount expended on account of capital during the year in water-mains, &c., is £1441, and the total amount expended on these works (less depreciation) is £43,600. In the profit and loss account the receipts from water sales are £5556, and the profit for the year is £1812. The liabilities are £40,008; the assets, £45,928; balance of assets in excess of liabilities, £5920. We shall publish the accounts in detail when they come to hand.

ROCHDALE CORPORATION GAS-WORKS.

The Monthly Meeting of the Rochdale Town Council was held on Thursday, the 2nd inst.—Alderman HEAPE in the chair The minutes of the Gas Committee were brought up, from which it appeared that, at their meeting on the 18th of August, Mr. Hunter laid before the committee his resignation as manager of the gas-works, and it was resolved that the resignation be accepted as and from the 30th of September next, and the committee passed the following resolutions:—"That the committee have to express their high appreciation of the services of Mr. Hunter, whilst acting as manager of the gas-works, and their regret at losing a servant so efficient and competent in the management thereof." "That the chairman, Alderman Baron, and Councillors Bolton, Tomlinson, and Petrie, be a sub-committee to consider and report on a successor to Mr. Hunter." This committee met, and at the next meeting presented a report stating "that they have had an interview with Mr. T. O. Patterson, the present assistant-manager at the gas-works, whom they consider well qualified, under the supervision of Mr. Hunter, the present manager, to undertake the management of the works, and have resolved (1) that the Gas Committee be recommended to appoint Mr. T. O. Patterson manager of the Rochdale Corporation Gas-Works, at a salary of £200 per annum, his duties to commence on the 1st of October next; (2) that the Gas Committee be recommended to appoint Mr. Samuel Hunter consulting engineer for 12 months from the 1st of October next, at a salary of £100 per annum. Your sub-committee may add that they have every confidence that the arrangements here proposed will ensure the successful working of the gas department." The committee endorsed the report, and recommended the council to ratify the arrangements there indicated.

On the motion for the adoption of the minutes,

Mr. ROBINSON expressed his objection to the arrangement proposed, on the ground that it was not desirable for an officer of the Rochdale Corporation to be employed by any other corporation.

Mr. ASHWORTH, a member of the Gas Committee, remarked that Mr. Hunter was retiring from the service of the corporation under circumstances which reflected the highest possible credit on himself, and the arrangement proposed was not one that Mr. Hunter had himself suggested, but one which the committee had thought it their duty to make, owing to the straits in which they were placed. There was a vast variety of matters—the new gas-tank; the new offices, &c.—which were just about completion, the details of which Mr. Hunter had at his finger ends, and in reference to them Mr. Hunter, in the handsomest manner possible, placed his services at their disposal, altogether apart from the question of remuneration. He thought the carrying out of this arrangement would conduce to the best interests of the ratepayers.

Alderman BARON, vice-chairman of the Gas Committee, said he thought that the benefit of the change in the way indicated by Mr. Robinson would certainly be in favour of Rochdale, for Mr. Hunter was certainly at present acquainted with everything connected with the Rochdale Gas-Works, and perhaps he might learn something at Salford that he might utilize here to our advantage. After acknowledging the handsome manner in which Mr. Hunter had offered his services for one day a week as consulting engineer, he said that while he left the question of salary altogether in the hands of the committee, it was thought that, as Salford paid him £500 a year for five days a week, his services for a time on the sixth day were at least worth £100 a year to Rochdale.

Mr. JOHNSON moved, and Mr. TWEEDALE seconded, an amendment to refer the minutes back to the committee for further consideration.

Alderman SIMPSON, chairman of the Gas Committee, protested against some of the remarks made by the last two speakers, in the absence of Mr. Hunter; not that he believed they would have the slightest weight in Rochdale, but read by persons in Salford, where the speakers were not so well known, they were calculated to create false impressions. Had Mr. Hunter been present to speak for himself, it would have been different; but under the circumstances in which he was placed he (Alderman Simpson) was sure the effect of those statements would be to raise Mr. Hunter in the estimation of the public, seeing how he had been treated and persecuted by the two gentlemen in question. After referring to the competency of Mr. Patterson for the new duties entrusted to him, Alderman Simpson remarked that the corporation had some very important works going on now at the gas-works—the erection of a gas-tank and gasholder amongst the rest. They had had one very large gasholder put in since Mr. Hunter came to the works, and a more successful piece of engineering was never perfected in the history of gasholder making. It was a matter of such importance that the spending of a few hundreds, or even a few thousand pounds was of little consequence compared with what might possibly occur if there were any neglect or want of skill in carrying out the work.

The amendment was then put to the vote, and lost, only four hands being held up in its favour. The original motion for the adoption of the minutes was carried by a majority of 27.

WATER SUPPLY OF OLD LONDON.

Writing of the discovery in Oxford Street, of which we gave a brief notice in the JOURNAL of the 31st ult., a correspondent of the *Builder*—Mr. John Phillips—has the following interesting remarks respecting the great conduit in Cheapside:—

"Fitzstephen, in his description of London, which he wrote in the reign of Henry II., speaks of the springs, wells, and streams in the City, as being in his time 'sweet, clear, and salubrious, 'mid glittering pebbles gliding playfully.' Until the thirteenth century the inhabitants of London obtained their supply of water for domestic uses partly from these sources, and partly from the Thames. But early in this century, owing to the diminished yield of the springs and wells, and their tainted condition from surface and cesspool percolations, and to the impure state of the watercourses, from the erection of buildings upon their banks, and the discharge of slops and waste water into them, the mayor and citizens were compelled, as Stow writes, 'to seek abroad for sweet water for the poor to drink, and the rich to dress their meat.' This they found in the slopes upon which Hanover, Cavendish, Grosvenor, and Portman Squares, and the adjacent streets, now stand. Here the subsoil, which consists of thick beds of gravel, interspersed with layers of sand, resting upon the blue clay, was full of water. This was derived and maintained from the rainfall upon the district sinking through the surface into the gravel-beds beneath. Out of these nine springs oozed at various places, and ran down the grassy slopes into the Tyebourne, which then flowed through the district from north to south, while Oxford Street passed through it from east to west.

"In 1236 the owner of the land, Gilbert Sandford, at the request of the king, Henry III., granted the springs in perpetuity to the mayor and citizens of London. These the corporation collected by lead pipes into a reservoir, which they constructed in the ground where Stratford Place, Oxford Street, now stands, and from the reservoir they laid a 6-inch lead-pipe to the great conduit in Cheapside. The pipe was laid in a south-east direction, across the fields between Regent Street and Bond Street, to a point in Piccadilly, about midway between the circus and the Geological Museum. From this point it was carried across the Haymarket and Leicester Fields to the King's Mews, which abutted on Hemming's Row, near Charing Cross. From thence it was continued along the Strand and Fleet Street, over Fleet Bridge, which then spanned the river Fleet, up Ludgate Hill, and along Cheapside, to the conduit, which was placed at the point between the Poultry and Bucklersbury.

"The length of the pipe was 4752 yards. As before stated, it was of lead, and 6 inches in diameter. The head or pressure from the surface of the water in the reservoir to the conduit mouth was 20 feet. Assuming that the supply from the springs maintained this head in the reservoir, the delivery at the conduit was 97 gallons per minute. Assuming, also, that the pipe was ⅜-inch thick, its weight was 234½ tons. So well was the contour of the section of the line of the pipe chosen, that nowhere did it rise above the general or hydraulic line of inclination. Hence no pressure was lost, no vacuum places were formed, and the discharge was the same as if the inclination had been uniform throughout. It was provided with a kind of stop-cock at its head for storing water in the reservoir at night, and also with stop-cocks along its course, for shutting off the water for examinations and repairs. There was notably one stop-cock on each side of Fleet Bridge, where the pipe came out of the ground and passed over the bridge. Here it sometimes burst, probably from exposure to the frost. There is reason to believe that here, too, it was provided with an air-vessel and cock at the summit of the vertical bend, for discharging the air which, most likely, accumulated at this point. This work was the first of its kind executed in England that we have any knowledge of. Hitherto it has not been alluded to in any history of water supply in England; but as it evinces eminent engineering skill, both in design and construction, it deserves high commendation. It would be interesting to discover whether it was the work of English or Dutch engineers.

"Certain merchants of Holland provided the pipe, in consideration of being permitted to have establishments in the City for the sale of their goods, and to import them free from river dues for a number of years. For the king's service in obtaining a grant for the springs, a hole of the size of a goosequill was allowed to be made in the pipe opposite the mews before mentioned, for supplying it with water. Subsequently, a half-inch pipe was connected with the main in Fleet Street, near Shoe Lane, for supplying a conduit which the mayor and citizens set up there. As the inhabitants of the City depended upon this main-pipe for their supply of water, the corporation never permitted any private person to meddle with it, or to take water from it. In 1478, however, one William Campion, who resided in Fleet Street, surreptitiously tapped the pipe, and conveyed the water into a well in his house, 'thereby occasioning a lack of water to the inhabitants.' For this he was imprisoned for a time, and then set upon a horse with a vessel of water like a conduit, having small pipes leading out of it, placed on his head. In this way he was taken round all the City conduits (the water running over him all the while), where the mayor's proclamation of his misdemeanour was read. Hew as then marched back to prison to abide the further will of the corporation.

"For several generations sufficient water ran at the conduit for the wants of the people. Thence it was brought to their houses in 'tankards,' holding about three gallons, by a class of men called 'water-carriers,' who resided chiefly in Cob's Court, Broadway, Blackfriars. In his play of 'Every Man in his Humour,' Ben Jonson has a water-carrier named *Cob*, who says, 'Give me my tankard . . . . . It's six o'clock; I should have carried two turns by this.' But in course of time, as London grew in size and population, and the springs yielded less water than formerly, owing to the reduced rainfall from cutting down the great forest north, east, and west of the City, the water running at the conduit was insufficient for the requirements of the inhabitants. This caused the corporation to bring other springs into the conduit-pipe from the manor of Paddington. In 1439 the Abbot of Westminster, to whom this manor then belonged, granted all the springs rising in it to the mayor and citizens of London, who then collected those on a suitable level into a reservoir at Paddington, whence a 3-inch lead pipe, 2805 yards in length, was laid into another reservoir which they found on the line of the 6-inch pipe, at the spot in Piccadilly before mentioned, 3509 yards from the conduit. The head of the water in the last-named reservoir was 12 feet above the conduit-mouth, 8 feet below the head in the reservoir at Stratford Place, and 12 feet below that at Paddington. In 1442 the Little Conduit by Paul's Gate, Cheapside, was built, and water laid on to it from the 6-inch pipe.

"The subterranean chambers recently discovered at Stratford Place, Oxford Street, are the remains of the reservoir whence the great conduit in Cheapside was supplied with water. The spring in the underground building said to have been subsequently discovered in Oxford Street, a few yards east of North Audley Street, is no doubt one of the nine springs which formerly supplied the reservoir. The building here referred to is approached from the surface by 16 steps, and has a cistern in the bottom, the water rising in which flows away through a pipe on each side. No doubt it was built over the spring for supplying some mansion in the locality with water long before the existing houses were erected. A precisely similar building to this, made in the reign of Henry VIII., still exists beneath the gardens of Kensington Palace. A description and representation of it may be seen in Faulkner's 'History of Kensington.'"

SPONTANEOUS COMBUSTION IN COAL.

By Professor P. H. VAN DER WEYDE.

We have drawn attention to the deterioration of coal in yards when not protected against rain by a shed or roof; but there is danger of a much more serious nature to which well-protected coal is exposed—namely, spontaneous combustion. There is not much danger of this with our anthracite coal, but bituminous coal, especially that mined at present in England from great depths, is very subject to this action; and, in fact, so many coal-ships have recently been destroyed by this cause, that it has been found necessary in London and Liverpool, during the past year, to raise the insurance premiums considerably. It has also occasioned the discussion of many theories, as to the true cause of these casualties, among British underwriters and others. The most plausible of these theories that we have met with are—first, that the coal-seams of the principal mines are getting so much deeper, that probably a more inflammable quality of coal is now being produced, or that it is shipped too quickly from the pit into the ship's hold; and second, that ships are over ventilated. It has been suggested that a remedy would be found in the adoption of a system of thermometers, constantly examined, at various parts of the vessel on deck, and some contrivance when undue heat is observed, for the injection of water on the affected parts.

This plan is impracticable, as the interior of a cargo of coal is not accessible for thermometers, while the water required to fill the spaces between the coal, so as to shut off the air, would sink the ship; one might as well make a hole in the bottom of the vessel. A better plan would be to shut off the access of air by means of carbonic acid or sulphurous acid gas, or rather to use these gases to drive out the air, and with it the oxygen, the cause of all combustion.

To do this from above, and let the gas pour in through a hole in the hatches, as proposed by a contemporary, is a very imperfect method, as in this way the gas mingles too much with the air. The correct method is to have a few perpendicular tubes, open at both ends, made of boards, say 6 or 8 inches section, reaching from the hatch above to the bottom of the vessel, through the centre of the cargo; if through such a tube sulphurous or carbonic acid gases were caused to descend, they would spread horizontally over the bottom of the ship, under the air, and displace the latter by lifting it, causing it to overflow out of the hatches, until all the interstices were filled with a gas not only a non-supporter of combustion, but smothering any flame already commenced.

For the development of these gases all that is required is an apparatus in which carbonic gas is developed by bringing diluted sulphuric acid into contact with bicarbonate of soda, chalk, marble dust, or any other cheap carbonate. The gas developed is by means of a hose conducted into the vertical tubes, through which it will at once descend to the bottom. In order to develop sulphurous acid, it is only necessary to burn sulphur, and the vapours arising therefrom may be conducted first upward, and then by a suitable arrangement

downward into the tube. If the sulphur were burned in or over the tubes, the heat would cause an ascending draft, and the gas produced would not descend in them, therefore it should be burned in an apparatus the shape of an inverted U, thus ∩; the gas ascending in one arm and cooling in the other, would then descend, and so reach the top of the long vertical tube, into which it would flow by its own gravity, as it is heavier than air.

Almost every one knows that the gas of burning sulphur will arrest fire in a chimney when the soot ignites, as is sometimes the case where bituminous coal is used, whence sulphur thrown on the fire will extinguish any flame in a chimney, and is often used for this purpose.

Vessels could be so built as to admit of the introduction of such gases at a few places in the sides between the beams; the channels for this purpose opening in the floor of the hold, by a number of small holes, would make the introduction of flame-suffocating gases by displacement of the air very easy, while the partitions of the hold could be made air-tight fore and aft, so as not to admit the gases into the forecastle or cabin.

Something of the kind ought to be done, as recently about a dozen large coal-ships were burned, and the insurance premiums on ships and cargoes of coal have been raised in England to 20s. per ton register, making the cost of transportation about equal to the value of the coal.

ROWBOTTOM'S IMPROVEMENTS IN RETORTS AND STOKING APPARATUS.

In the "Register of New Patents," given in the JOURNAL of June 22 last, p. 947, was an abstract of the specification of a patent taken out by Mr. Rowbottom, of Halifax (No. 3095, Sept. 9, 1874), for "Improvements in retorts, and in means or apparatus for charging and discharging the same." The *Halifax Guardian* of the 28th ult., referring to this invention, says: "On Tuesday last, in company with several members of the Gas Committee of the Halifax Corporation, we witnessed an early trial of a machine designed and constructed for this purpose at Messrs. Crossley's works, Bank Bottom, by Mr. John Rowbottom. The process of charging and recharging retorts in gas-works is so laborious and exacting to the men employed as to command a very high rate of wages; and, as a natural consequence, in seasons when the largest quantities of gas are required, gas companies are too often literally at the mercy of the stokers. We have in this neighbourhood seen a whole community sentenced to candles and other 'lights of other days,' and zealous members of local boards doing amateur stoking, in a stokers strike. And the Government, in its recent relaxation of the labour laws, thought it requisite to exclude from that benefit those whose strikes and violence might imperil life and property by plunging our towns and cities into utter darkness. The cost also of the operation is a most serious item in gas-making. In 1874, the Halifax Gas Committee state the cost of wages for manufacture at £5374 2s. 9d., the cost of the coal and cannel used being £17,216. In these wages some labour is possibly included besides that of stoking; but the more detailed summary of the Bradford Gas Committee for 1874 gives a special item of £9035 9s. 4d. for the wages of stokers; the cost of the coal and cannel being £58,352 10s. 2d. Mr. Rowbottom having all his life seen the operation of stoking, and the inconveniences attending it, has brought his practical knowledge to bear in devising a machine which, by one process, discharges and recharges the retorts. The time occupied in this process on Tuesday was two and a half minutes; but it is confidently expected that, with experience, the process need not exceed one and a half minute. The retort erected for the experiment is 13 feet long; but as retorts now are made 18 feet, the apparatus itself is that length. It is difficult without plan to explain the process, and gas engineers and gas companies will not fail to make themselves acquainted with the specification of the patent. The machine will require a railway laying down in front of the stacks of retorts, with turn-tables at the end to lead to the other stacks. Upon the moveable carriage, supported by pillars at each corner, is a square receptacle for a large quantity of coals; and a steam-engine occupies one side of the space thus covered over, whose first business it is to drive the apparatus exactly opposite the door of the retort. By other motions as much coal as is required for the charge is let down a hopper into a receiver, which the patentee calls a 'promover,' and which, by an ingenious arrangement, has at the end a hinged door, which pushes out the coke, and then, in its return, permits the coal to be dropped along the whole length of the retort as a new charge. This was done very effectually in the experiment we saw; and it was evident that, whilst not preventing the deposit of carbon, which in itself is rather an aid to gas-making than otherwise, it will effectually prevent its accretion in masses, which is a hindrance to the process. Not only can the locomotive move onwards from retort to retort, but the 'promover' can be lifted up to an upper row of retorts, and the only men who need go near the fires are those who open the doors, and the operator who points and directs the 'promover.' Even as to these the exposure to heat is much reduced by the first part of Mr. Rowbottom's invention, which consists in constructing the mouthpieces and doors with a water-space in which water can be circulated, thereby keeping the jointing cool, 'so that any ordinary packing may be used for making gas-tight joints without the aid of clay or other plastic material.' The door and the cross-bar hinged to the mouthpiece are also made to have a lateral movement, greatly facilitating the opening and closing. A third invention included in the patent is for a creeper or chain of buckets to cool and load the coke from the retorts; but if the first and second inventions prove as practicable in general as they did on Tuesday, we may congratulate our ingenious fellow-townsman on having conquered a difficulty which has long baffled inventors, and having provided for gas managers and committees a safeguard against trouble, which, when fully satisfied of its utility, they will not be slow to adopt."

A NEW LIGHTING AND HEATING GAS.

[From the *American Engineering and Mining Journal.*]

It would appear as if a practical success had been attained in the process invented by Mr. T. S. C. Lowe, of Norristown, Pennsylvania. His method consists in producing, from anthracite and the decomposition of steam, a gas of very high heating power, and then enriching this by means of crude petroleum when the gas is to be used for illuminating purposes. The anthracite is charged in a small cupola of, say, 3½ feet in diameter, the bed of coal being kept from 3 feet to 4 feet deep. When fairly ignited, the base is closed, and superheated steam is admitted through tuyeres a short distance above the grate-bars; the steam in contact with the burning coal is decomposed, and the gas produced is a mixture of hydrogen and carbonic oxide.

The cost at which this excellent heating gas is produced is very small indeed, and its application in metallurgical processes and for domestic use offers many important advantages. Of course, it is in this state entirely unsuited to illuminating purposes. To enrich it, a small jet of crude petroleum is directed on to the surface of the burning coal; the gases are thus mixed in the nascent state, and to still further ensure their thorough mixture at a high temperature, they are passed through a chamber formed of fire-brick, with small spaces between the bricks, heated in the manner of a Whitwell hot-blast stove; this ensures a thorough mixture at an exceedingly high temperature.

The charge which has been used in some of the works using this process has been about 280 gallons crude petroleum and 3600 lbs. anthracite for the production of 70,000 cubic feet of illuminating gas, the total cost amounting to 56 to 60 cents per 1000 feet.

This promising improvement in gas-making has passed the stage of mere experiment, and appears to have entered that of practical success. Warned by the fate of several naphtha and petroleum processes brought out with many promises and small performance, the inventor of this process and his friends determined to thoroughly test this invention on a practical scale before giving it publicity. They erected their first gas-works at Phœnixville, Pennsylvania, a place of some 10,000 inhabitants, and have since put it in operation at several small towns. It is, we understand, successfully working at each of these places, at Phœnixville having now for 18 months lighted the town to the general satisfaction. The cold of the past two winters has affected this gas no more than, if as much as, ordinary coal gas, and, consequently, the fixedness of this product appears to be fully established.

To demonstrate the adaptability of the system to the lighting of large cities, works were established by arrangement with the Utica Gaslight Company, and we are informed that, for the past three months, the city of Utica has been lighted exclusively with gas made by this process; and we understand the Gaslight Company is so well satisfied with the results that it proposes to adopt it permanently. Not the least item of saving effected by this process is in labour. Only two men—who are common labourers—are employed at the Utica works, and their time is but partially occupied; the addition of one more would suffice for a production of four times the present supply. The cost of the gas in the holder is claimed to be not over one-half that by the old method, while the quality of the light is very satisfactory.

DUNDEE WATER SUPPLY.

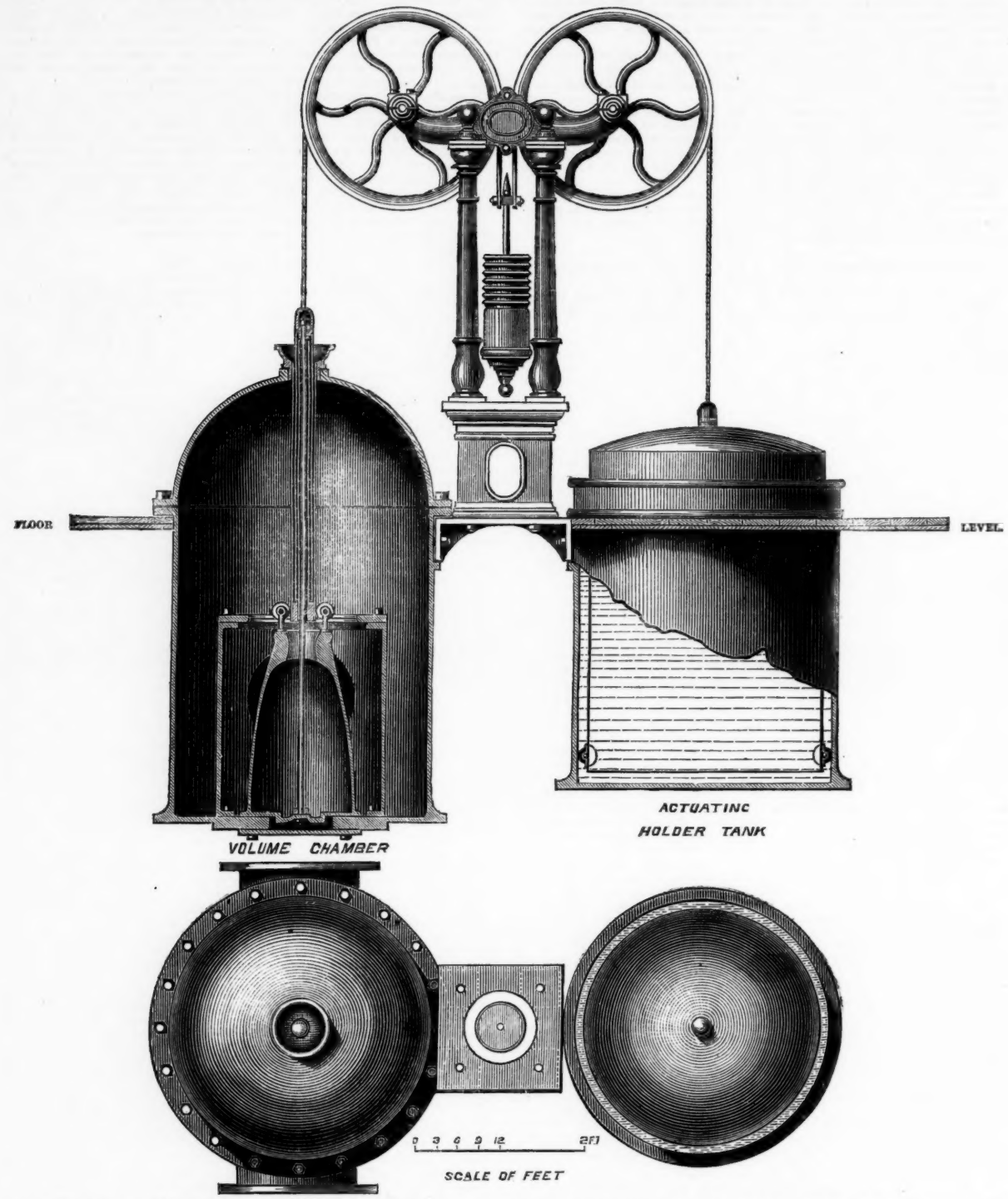
TESTING THE PIPES AT LINTRATHEN.

On Tuesday, the 14th inst., according to arrangement, the Dundee Water Commissioners proceeded to Lintrathen for the purpose of witnessing the effect of the application of the hydrostatic test to the portion of the piping between the measuring cistern at the Loch and Pitnappie, the distance being about 10 miles. The commissioners present at Lintrathen were Provost Cox, Bailie Robertson, Bailie Macdonald, Mr. Gray, Mr. Drummond, Mr. Smith, Mr. Haggart, Mr. Brownlee, Mr. Kerr, Mr. Anderson, and Mr. Philip, with Mr. Watson, the manager, and Mr. Leslie, C.E., and Mr. Stewart, C.E., the engineers for the works. Mr. D. Y. Stewart, Mr. Kay, and Mr. Browser, as representing the contractors, were in attendance. At Pitnappie Mr. Ballingall and others of the commissioners watched the operations. Inspectors were in charge at the sluices at Clatto, Pitnappie, the Isla, and Shanziebrae; and Mr. Jarvis, the resident representative of the engineers, and Mr. Pollock, the manager for the contractors, generally superintended the arrangements. The commissioners left Dundee by train at half-past eight o'clock, and, immediately on reaching Newtyle, the unwelcome intelligence was received that the joint of a pipe near Fullerton had been blown, some hours before, by the force of the water. It was, however, explained that the defect had been remedied, and that there was no obstacle to the test being carried out. Immediately the journey to Lintrathen was recommenced, and, when all had arrived there, the water was again turned on. At first the flow was at the rate of 400 cubic feet per minute, and this volume was continued from noon till four o'clock. Afterwards the sluices were lowered, and the water admitted in much smaller quantity. About half-past five it was observed that the water was rising in the measuring cistern, showing that the pipes were becoming full. It was the intention that the water in the cistern should rise to the top of the overflow. For a short time it did rise, but only for a couple of feet or so; and, when the distance from the surface to the top of the overflow was about 9½ feet, it was noticed that the water suddenly fell, and it became evident to all that an accident of some kind or other had occurred, although the nature of it could not be explained. It was now dark, and it was, of course, impossible to make a personal examination of the track; and it was accordingly decided to wait at Lintrathen till the arrival of one or other of the men who had been stationed at the sluices. About nine o'clock it was learned that a pipe had burst in the vicinity of Jordanstone, and that immediately the nearest sluices were opened, and the water allowed to escape. At the Isla, when the accident occurred, the gauge indicated 490 feet, or within 60 feet of the hydrostatic test, but there was an immediate fall to 100 feet. In the circumstances nothing further could be done, and, as the contractors were not at hand, inasmuch as they had been driving all over the track, it was thought expedient to proceed to the Belmont Arms Hotel, where they were staying, in order to ascertain what course they intended to pursue, in order to have the test satisfactorily performed. Mr. D. Y. Stewart, on the part of the contractors, said they were desirous that the test should be accomplished to the satisfaction of the commissioners. The burst which had taken place might have been expected, considering the rapid manner in which the water had been admitted. The accident could be repaired in a few hours, but, with the view of having a thorough inspection of everything, so that, if possible, the commissioners might not be again disappointed, he suggested that the test should be repeated on Friday. This proposal was acquiesced in, and the commissioners drove to Dundee, where they arrived shortly after midnight.—*Dundee Advertiser.*

COLOMBO GAS AND WATER COMPANY, LIMITED.—The report of the directors of this company for the year ending December, 1874, states that the business of the company had been steadily improving. The number of burners in use had increased, during the 12 months, over 25 per cent., and orders from private consumers were constantly coming in. The fresh arrangements with the Municipal Council, as well as the reduction in price of gas to private consumers—alluded to in the interim report, issued in October last—had worked to the satisfaction of the board. The accounts showed that the profit on the year' sworking amounted to £3418 10s. 5d., but that this sum had been nearly absorbed by the payment of interest on loans and debentures—viz, £3210 4s. 9d., leaving an available balance of £208 5s. 8d. which the directors recommended should be appropriated as follows:—viz., £156 17s. 7d. in the payment of a dividend, at the rate of 7 per cent. per annum, to the holders of the preference shares, and the balance (£51 8s. 1d.) carried forward. The directors thought it well to add that, if the first half year's working in 1874 had been equal to the last, there would have been a profit available for a dividend on the ordinary shares. The manager reports that the plant is in a most efficient working condition, and that he is sanguine as to the prospects of the company for the present year.

HONG KONG AND CHINA GAS COMPANY, LIMITED.—The last report of the directors of this company states that taking into consideration the depressed condition of business in Hong Kong during 1874, as well as the loss of gas and lessened consumption, caused by the fearful typhoon in September of that year, they believed that the shareholders would be pleased with the result of the working. After paying interest on the debenture debt, which had been, on the 31st of December last, reduced to £3500 (£3800 having been paid off during the past year), there remained £7714 7s. 7d. at the disposal of the shareholders, which the directors recommended should be appropriated as follows:—£5840 9s. 1d. in the payment of a dividend at the rate of 10 per cent. per annum (£2850 5s. 5d. of which had already been paid as an interim dividend) £1167 19s. 11d. as a bonus at the rate of 2 per cent. per annum, £500 added to the reserve-fund (which thus stood at £4579 3s. 7d.), leaving £205 18s. 7d. to be carried forward. In accordance with his original agreement with the company, Mr. Glen, the concessionaire, was entitled to one-fifth of the new capital, or £4000, in addition to his bonus as a shareholder, and he had very liberally accepted 100 fully paid-up shares in satisfaction of both claims. With the exception of the general stagnation of trade in the colony, the latest advices from the works were quite satisfactory. The officers of the company continued to use their best endeavours for the success of the undertaking, and to the manager and local staff the directors best thanks were due for their energetic behaviour during the typhoon before alluded to. The revenue account showed that the gas-rental for 1874, amounted to £15,961; meters, £350; residual products, £3001; profit on fittings, £412. The cost of coal carbonized was £5447; working expenses, £3996; works maintenance, £1226, &c.

KEY'S PATENT SAFETY STATION GOVERNOR.



At the recent meetings of the British and North British Associations of Gas Managers, Mr. William Key, engineer of the Accrington Gas and Water Works, exhibited drawings, and gave explanations of the working of a new station governor invented by him, the simplicity and efficiency of which appeared to give much satisfaction to the members.

The drawing annexed shows the general arrangement of the governor referred to, and the improvements by which the inventor claims to have ensured perfect safety in operation, ready means of access to every part of the apparatus for the purposes of cleaning, repair, or renewal, and a considerable economy by the saving of leakage.

The principle adopted by Mr. Key, with a view to secure these objects, consists chiefly in the separation into different chambers of the cone-valve and the actuating gasholder. The cone chamber, it will be seen, is covered over by a cast-iron dome. The upper flange of the lowest portion of the chamber comes above the floor level, and the top, or dome cover, is fixed to this chamber by a flange and set-screws every six inches. This construction renders it very strong and safe, and quite impossible for any gas to escape from it to endanger the supply to the town, or stock of gas on hand. The chamber is easily accessible by undoing the set-screws, and the examination of the cone chamber can be made without in any way interfering with the holder chamber. Through the centre of the crown of the dome is fixed a strong water slide, mercurial seal, or stuffing-box. In the case of a 15-inch governor, this slide is 3 feet long. It is formed of ordinary wrought-iron lap-welded tubes of the diameters of 3 inch, 2 inch, and 1 inch respectively. Through the inch tube presses a rod for the purpose of lifting and lowering the cone. The gas, with the pressure from the gasholders, is, in this instance, passed into the chamber *over* the cone, and is regulated downwards through the cone-valve to the outlet.

The actuating holder is placed in a tank of the same diameter as the volume chamber, and is hung by suitable chains and gearing to back weights, as described in sketch. The holder is actuated by the pressure of the gas in the street-mains, which is led into it by a suitably-sized tube having a controlling stop-cock. On this tube, inside the governor-house, is fixed an ordinary wheel-valve, which is screwed down until the desired gradual action, in letting on and off the pressure, is attained to the satisfaction of the engineer. In an ordinary governor, by the careless removal or replacement of the governor weights too rapidly, the effect produced is a sudden jumping up or down of the consumers lights; but with this apparatus, supposing the whole of the weights were taken off at once, the cone-valve would not open any faster than the volume of gas in the actuating holder could pass out of the latter, through the small opening or tube connected with the street-mains; nor, on the other hand, would the holder be too rapidly filled from the mains by the whole of the weights being suddenly put on; thus the alteration of pressure is gradually and almost imperceptibly effected.

Outside of the governor-house, in any suitable position, another tap is fixed on the tube passing from the street-mains to the governor, whereby, in case of fire or accident, or for the purposes of repairs or cleaning, &c., the entire flow of gas to the holder can be at once turned off, without in any way affecting the supply of gas to the district. On closing this tap the gas continues to pass, as previously, the actuating holder only being fixed. But, inasmuch as more pressure would be wanted under these circumstances, the cone would have to be lowered by hand until the required volume of gas had passed, and, of course,

the governing motion would be suspended until the tap was turned on again. An important object is thus attained. It has frequently happened that whole towns have been suddenly put in darkness by the gas being turned off at the holders during governor accidents, owing to the fact that ordinary governors and bye-pass valves are sometimes not approachable under the circumstances, or are found to be fixed and fast, and, therefore, unworkable.

By this arrangement, any day, at the pleasure of the manager, the outside tap may be shut off and the actuating holder lifted out for the purpose of cleansing, painting, or repair; also, at the same time, or as often as may be deemed prudent, the water in the tank may be run off and replaced, thereby keeping the whole thing in clean condition, and preventing the escape of vapours which would discolour other fittings in the governor-room.

The chains from the cone rod and holder are suspended over pulleys to a rod fixed to the back weight, forming a table for laying on the pressure weights in the usual way.

It is claimed for this arrangement that it is a safety governor, and that, in connexion with it, there is no absolute necessity to fix expensive bye-pass valves, although, if desired, they may readily be adopted. Another advantage arising therefrom is the prevention of oscillation. The cone, being hung by a rod, and working through a strong slide, any action by the wind or otherwise upon the holders cannot set up the jerking motion which becomes so alarming to engineers having governors with large holders as compared with the size of the cone. As with this apparatus the holder is actuated only through a small tube in the street-mains, oscillation of the kind just mentioned becomes impossible.

The action of this governor is of a very delicate nature, and by its operation a steady pressure is maintained. When the cone-valve is entirely closed, there is on the holder 12 inches of seal or dip; there can of necessity, therefore, be no gas passing to the street-mains, and none can, under any pressure at the works, escape from under the holder, as the cone would be shut perfectly tight before the pressure could reach the mains. Even if it were possible for gas to "blow" from the holder, no more could escape at one time than would pass through the small regulating-tap in the governor-house.

The cone can be very readily got at by unscrewing the set-screws fixing down the dome, the whole, as before stated, being above the floor level. There are no additional working parts that can in any way get out of order than in an ordinary governor. The whole apparatus does not occupy so much floor space, and it can be fitted up by any handy man about a gas-work.

Two 15-inch governors of this description are about to be fixed at the Accrington Gas-Works.

THE WATER SUPPLY OF PHILADELPHIA.

The rapid growth of the city of Philadelphia, and the necessity it has for an abundant and cheap water supply, makes the subject one of the greatest interest and importance. The *Ledger*, in a recent issue, has a very interesting editorial on this subject. It says: "It is not too much to say that no city in the world, of the rank and importance of Philadelphia, situated as Philadelphia is, on a broad and deep arm of the sea, is as well supplied by nature with the means for a copious supply of good, wholesome water. And yet, with such unrivalled facilities for such a situation, the city has been for years past more or less disturbed by agitations both as to the quantity and quality of the water supply. This has been the theme of councils and council committees, of 'engineers' and contractors, and of discussions through the newspaper press. One might be led to think that it is beset by enormous difficulties, and yet no one who undertakes to examine it dispassionately, apart from 'jobs' and what is supposed to be the interest of small sections and localities, can find any great difficulty about it, except that the subject is not capably managed, and that the city did not do in season what it ought to have done long ago.

"The three points of importance are, an abundant supply, good quality in the water, and the most economical system of pumping machinery and other appliances. For present purposes, and for the probable exigencies of the next 30 or 40 years, the Schuylkill puts within the reach of Philadelphia the available means for all three of these important essentials. First, as to the quantity of the supply, it should hardly need argument to show that a stream that flows over the dam at Fairmount an average of more than 1500 gallons every 24 hours, is quite certain to be able to furnish a copious supply of water to a city that needs an average of 40 millions of gallons a day now, and is not likely to need an average of more than 100 millions a day within the present century. Certainly there is enough here for the use of the inhabitants for generations to come for the ordinary household, manufacturing, and other purposes for which our water supply is now used. So much for that branch of the question. But the overflow of the Schuylkill is valuable for other uses than a supply for the purposes named. It is the most economical power for driving the pumping machinery to lift the water into the high reservoirs from which it is distributed for use throughout the city. Is there a sufficient average flow of water down the Schuylkill abreast of the city to drive pumping machinery that will give us an average of 40, 50, 60, 80, or 100 millions of gallons a day for distribution daily throughout the city whenever so much shall be needed? This is, of course, a question for those acquainted with the rainfall over the area drained by the Schuylkill, the amount lost by evaporation and escape out of the area drained by the river, and for engineers capable of calculating the amount of pumping energy that remains in what reaches the several dams in the neighbourhood of the city at Flat Rock and Fairmount. Engineers and other authorities differ somewhat in their answers to this question, so far as it relates to the wants of the city a generation or two in the future; but it may be said that the best authorities are of the opinion that there is an abundance of water for all the purposes mentioned for the present and for the near future, provided the whole of the flow and power of the Schuylkill shall be utilized, and not allowed to run to waste as it does now, and provided the water-wheels to do the pumping are properly placed. Thus we have reason to believe that we have in the Schuylkill the means of an abundant supply, and a cheaply furnished supply, for so long a time to come, that we need be in no trouble about the next third of a century at least.

"Then as to the quality, Dr. Cresson's recent report of his examinations shows that nearly all of the injurious pollution found in the Schuylkill water at some seasons of the year comes from sources quite close at home, all of which are under the control of the city, and every one of them preventable or avoidable. There can be no reasonable doubt of this. Here the third of the three essentials is made quite available.

"What, then, should be the policy of the city authorities? Clearly to seek for and adopt the best system for utilizing the whole flow and power of the Schuylkill, so as to secure an abundant supply for all seasons, both for consumption by the inhabitants of the city, and for the most economical power to drive the pumping machinery. Water power is cheap, steam power is costly; in the proportion of at least ten to one. The further policy is to adopt, without delay, the most effective means for preventing foul drainage from emptying into the Schuylkill above the dam, and within the city limits. The man who is put upon his proof to show that such is not the right policy—whether such man be 'engineer' or layman—will have rather a difficult task.

"What, then, shall be done now? Provide, as soon as it can be done, for what is indispensable, next year, and do it in such a way as will make what is done now useful in any approved system that may be adopted hereafter, and in the meantime appoint a competent commission to ascertain whether the flow of the Schuylkill can be utilized to the extent required for the present and next coming generation."—*American Gaslight Journal.*

COAL IN AMERICA.

Recent surveys and explorations near the Pacific coast, in Washington Territory, give us some important facts in regard to coal for the Pacific States. These explorations, albeit under the direction of the Northern Pacific Railroad, are regarded with confidence on account of the character of the surveyor, Mr. Philip G. Eastwick, an engineer professionally familiar with the coal-fields, both anthracite and bituminous, of Pennsylvania. He was sent out by the Northern Pacific Railroad Company late in 1874; but the winter interrupted his field operations, which were resumed early this spring, and the report referred to above is his first official statement of the results of his survey. His report covers the Puyallup Valley, about 25 miles from the town of Tacoma, which is the terminal city of the road. The Puyallup River flows northward, and pours into Puget Sound. Its tributaries are Little White River, South Prairie Creek, and Flett's Creek. This is in latitude 47. Mr. Eastwick's report specifies the locality, size, thickness, and dip of at least a score of the out-croppings discovered and examined by him during the past few months. They vary in thickness from a few inches to 20 feet, the average of those reported being nearly 8 feet. The dips range from 40 degrees to vertical, the average being about 60, "generally in directions either to the east or to the west, while the strata cross the country from north to south." From these data it is held to be probable that this Puyallup region is either the eastern out-cropping of a large basin lying to the west, or else an intermediate "principal anticlinal axis," lying between two sub-basins. In either case, it seems likely that coal in large quantities underlies the greater part of the Puget Sound Valley, of which the greater part of the soil is the drift formation. One theory—which is merely theory—is that these out-croppings lead to immense coal-fields, extending far under the Pacific. As to extent, Mr. Eastwick estimates that, while the area in miles cannot be approximated without very much more extensive and close surveys, the quantity available is enough to revolutionize first the coal trade of the Pacific coast, and ultimately the manufacturing interests of that region. His first estimates last fall were that, with two openings—one at the shore line, and one by a slope on the bed to a depth of 100 yards below the surface—a yield of 480 tons daily could readily be had. Now, after these spring explorations, he thinks that an amount of coal, far in excess of the probable demands of the Pacific coast, can be obtained at once, without resorting to deep mining at all. As to quality, the coal discovered varies in character from lignite, or "brown coal," found near the western boundary of this coal region near the ocean, to the pure anthracite that abounds in the detritus of South Prairie River. Between these extremes there are grades of all qualities of the bituminous coals, the most common being the long and short flaming species. The lignites lie towards the Puget Sound shores, and the bituminous and anthracites up in the Puyallup Valley.

The demand for coal in San Francisco alone is about 1500 tons a day; and this quantity is steadily increasing. Beginning with 1872 and ending with 1874, the importations of coal into that city were as follows:—434,467 tons, 454,582 tons, and 531,947 tons. The price is about 11 dols. a ton, which shows ample room for competition or increase of quantity. The importations for 1874 were made up of 227,952 from foreign countries—mainly Australia, England, and Vancouver's Island; 27,152 tons of anthracite from Pennsylvania, and 246,494 tons from the Pacific coast—all of which is bituminous of the poorest quality. Anthracite is obtained only in Pennsylvania, although some stony varieties, mined in Rhode Island and in Virginia, are classified as anthracite. The presence of fine anthracite in this Puyallup "find" is hence of great importance. Mr. Eastwick pronounces the coals, both bituminous and anthracite, here discovered better than those heretofore used on that coast—the former better than the native, and the latter better than the imported or the Pennsylvania varieties.

The means of transportation are somewhat difficult; but the nearness of water, which must be reached by bridged roadways, renders the difficulty not insurmountable. Besides, some time in the distant future, possibly in a few years, the Pacific end of the Northern Pacific Railroad may begin to be useful in that way, passing as it does through portions of this coal region. And, whatever may be realized from that road, the presence of the valuable mineral will soon command or create routes and means of transportation.

The coal mining of the United States, according to the last—the ninth—census, had in it a capital of 110,008,029 dols.; the annual yield being 32,863,690 tons, worth 73,524,992 dols. The capital is divided into 51,016,785 dols. in anthracite, and 58,991,244 in bituminous. The ton yield is 15,664,275 of anthracite, and 17,199,415 of bituminous; and the value of these respectively is 38,495,745 dols. and 35,029,247 dols.

The coal measures of the entire country now number seven. 1. The New England basin, in Massachusetts and Rhode Island, covering 750 square miles, there being 11 beds, the maximum thickness 23 feet. The coal is plumbaginous anthracite. 2. The anthracite basins of Pennsylvania, the most important in the United States, covering 434 square miles, the average amount of coal-beds being about 70 feet, the maximum being 207 feet. 3. The Apalachian field, covering an area of 63,475 square miles, extending from Pennsylvania to Alabama, 700 or 800 miles in length. It lies in eight States—in Pennsylvania there being 12,222 square miles, averaging 40 feet of coal in thickness, the measures ranging from 825 to 2535 feet in thickness; in Maryland, 550 square miles, about 5 feet of coal in thickness; in the Virginias, 16,000 square miles, averaging 51 feet of coal; in Ohio some 10,400 square miles, averaging 40 feet of coal; in Eastern Kentucky about 10,000 square miles; in Tennessee, 5100 square miles, averaging, probably, 7 feet of coal; in Georgia, 170 square miles; and in Alabama about 9000 square miles. 4. The Michigan basin, between Lakes Michigan and Erie, covering 6700 square miles, the maximum thickness of coal being 11 feet. 5. The Illinois basin, covering 51,700 square miles. It lies in three States—in Illinois, 41,500 square miles, average thickness of coal being 35 feet; in Indiana, covering 6500 square miles, 31 feet of coal; and in Western Kentucky, 3700 square miles. 6. The Missouri basin, the largest on the continent, and probably the largest in the world, the area being something like 104,600 square miles—larger than the four middle States—New York, Pennsylvania, New Jersey, and Delaware—taken together. It lies in seven State divisions—in Iowa, about 25,000 square miles, about 8 feet of coal; in Missouri, 27,000 square miles, less than 6 feet thick; in Kansas, 17,000, same in thickness as in Missouri; in Arkansas, 12,000 square miles, probably 4 or 5 feet thick; in Indian territory, estimated 13,600 square miles; in Texas, 6000 square miles; and in Arizona, perhaps 4000 square miles. 7. The Pacific measures, spoken of above, where Mr. Eastwick has been surveying.

Thus it appears, without counting the latest discoveries, which are not yet defined, and without counting areas of coal in the triassic or cretaceous formations, and in the tertiary, where there are lignites, we have marked out by somewhat definite surveys an area of 228,059 square miles of coal measures. These measures range from 3000 feet in thickness, with 70 feet of coal, in the anthracite basins in Pennsylvania, to a few feet in thickness and a few inches of coal in the Michigan basin. The aggregate area is greater than that of the New German Empire (225,000 square miles), which support a population of over 40 millions.—*Standard.*

GAS EXPLOSION IN A CHAPEL.—Just as the Rev. Mr. Berry had concluded the morning service at St. Alban's Roman Catholic Chapel, Blackburn, on Thursday last, a smell of gas was experienced. The rev. gentleman made his way to the lower part of the premises with a lighted candle, and, on opening the door of the wooden casement in which the meter was kept, a large quantity of escaped gas rushed out and exploded, severely injuring Mr. Berry.

IRON AND COAL TRADES OF SHEFFIELD, SOUTH YORKSHIRE, AND NORTH DERBYSHIRE.

(FROM OUR OWN CORRESPONDENT.)

In point of the actual amount of business done, there has been little or no change during the past week in the condition of the district iron trade, nor does any alteration appear likely to take place for some time henceforward. There have been several fairly good transactions in foundry pig iron, and a few in forge qualities, on terms which have been, to a slight extent, in favour of the sellers. The quotations for pig iron all round have been well maintained, the following being the figures of the local agents for North Yorkshire firms, for G. M. B.:—No. 1 foundry, 58s. 6d.; No. 2 foundry, 54s. 6d.; No. 3 foundry, 53s.; No. 4 foundry, 48s.; No. 4 forge, grey, 47s. 6d.; No. 5 forge, mottled, 47s.; No. 6 forge, white, 46s. 6d.; refined metal, 70s.; Kentledge, 58s.; and cinder pig, 40s, all per ton for net cash.

At the Atlas Iron and Steel Works of Messrs. John Brown and Co., Limited, the puddlers struck last week against the attempt made by the firm to reduce their wages to the Staffordshire level of 9s. 6d. per ton, but the matter has since been arranged by a compromise, and the men resumed operations yesterday (Monday). At the Park Gate Iron-Works, the puddlers and millmen have come out on strike from a somewhat similar cause, their wages having been put on the same level as those awarded in Staffordshire, whereas they say they are entitled to an additional 6d. per ton, in accordance with a very old custom of this part of the country. At the Normanton Iron-Works, a dispute on very similar points has arisen between the men and their employers, but it has been agreed that the matter shall be settled upon the same basis as at Park Gate. At the works of Messrs. Charles Cammell and Co. and other iron-works in the district, the men are also greatly dissatisfied, and strikes are not unlikely to take place. It is, I may say, very probable indeed that these numerous and frequently occurring disputes will have the effect of causing a severance between the northern and Staffordshire sections of the Ironworkers Association. The northern men are said to allege that they are ahead of Staffordshire in almost every respect, and that they will not be longer ruled by the latter. A meeting, to decide the question, will, it is stated, take place at Wednesbury on Monday, Sept. 27.

Most of the foundries hereabouts are still doing a fairly good amount of business, although the week has been much broken up by the attendance of the men at Doncaster races.

The coal trade remains very quiet indeed. Stocks are tolerably large, and no very heavy tonnage is being sent to London. The shipping orders for gas and other coal are being got through as rapidly as possible, in order to anticipate the closing of the Baltic navigation.

IRON AND COAL TRADES OF SOUTH STAFFORDSHIRE AND EAST WORCESTERSHIRE.

(FROM OUR OWN CORRESPONDENT.)

The wages dispute in the iron trade is now practically at an end. In some few cases slight difficulties with the men are still reported, but they are not of such a nature as to affect the general settlement of the question, and, as a rule, the mills and forges throughout the district are again in operation. No active measures have yet been taken towards the reconstruction of the conciliation board, though the representatives of the men are fully aware of the advantages of such a tribunal for the adjustment of trade differences, and have already held several conferences with the men on the subject; but, until the operatives are more thoroughly organized, and confidence in them is again restored, it is unlikely that the board will be established on a permanent or satisfactory basis.

In consequence of the partial stoppage of the works, and in prospect of a prolonged struggle between capital and labour, orders, though chiefly of small extent, have been rather freely distributed during the past fortnight, and most of the mills are fully employed. Sheet makers continue busy, chiefly on galvanized roofing qualities, and boiler-plates are in steadily improving demand. Prices are without noteworthy alteration since last report, but the tendency is in the direction of firmness. Common bars range from £7 15s. to £8 5s. per ton. Sheets (singles) are quoted £10 15s. to £11, the latter being now the more general quotation. Pig iron is only in limited demand, but, in consequence of the restricted production, prices have so far been upheld. Foundry iron is in tolerably active request for local consumption, the heavy engineering and hardware trades of the district being unusually buoyant. Cinder pig is quoted £2 15s. to £2 17s. 6d. per ton; all-mine hot blast, £4 10s. to £4 15s.

In coal there is little alteration. The best qualities still command a moderate inquiry, but prices for the commoner classes of fuel are weak and irregular. Forge coal of good average quality may now be had at 7s. 6d. per ton at the pits. Coke is easier—the Durham and Derbyshire makes are now coming into this district at considerably reduced rates. Gas coke is quoted 13s. per ton at the works.

The wrought tube and fitting trades of Wednesbury are slowly but steadily improving, and the general aspect of these industries is decidedly more encouraging than it has been for some time past.

THE COAL AND IRON TRADES OF LANCASHIRE.

(FROM OUR OWN CORRESPONDENT.)

The change of the season is bringing out orders for house coal more freely. Private consumers are beginning to take in stocks, and most of the merchants are now making arrangements for their winter deliveries. Prices in the Manchester market keep much about the same, and best coal is firm. For engine and furnace coal there is a slower sale, and although there is no pressure to sell the better qualities, common class fuels are very pushed in the market at very low rates.

From the outside districts an improved feeling is reported. A better business is being done in the Oldham and Tyldesley districts, and in the Wigan district a fair trade is being done in best coal; but common coal still hangs heavily on the market. Prices, however, are without any material change.

There has been a little more doing in coal for export purposes, but the coasting trade is still very dull.

So far as stocks in Lancashire are concerned, although at a few of the pits and in some of the yards considerable quantities have been put down, generally they are not at all heavy, and, if anything, scarcely sufficient to meet the extra demand for winter supplies. But this arises solely from the restricted get, and there are ample means of very largely increasing the production to fully meet any extra demand that may come upon the market. Any scarcity of coal during the winter is, therefore, not at all to be apprehended.

The coke trade continues exceedingly quiet, and there is a sensible giving way in prices, large cokes in the Manchester district being purchasable at 2s. per ton under the nominal list rates.

The strike at Messrs. Blundell's collieries in the Wigan district is, as I anticipated, coming to a speedy close. Most of the men have now returned to work, and the remainder are expected to follow in the course of a few days.

The iron market continues very dull, and although No. 3 foundry pig iron is scarce for this month's delivery, quotations for delivery over a few months are low, and as soon as the pressure of shipping orders is removed, there is little doubt prices will return to their former level. To forward delivery in this district, No. 3, Middlesbrough foundry, is now quoted at 60s. per ton; No. 4 foundry, 57s. 6d.; No. 4 forge, 55s. 9d. per ton. The manufactured iron trade is still quiet, and bars are easier, although rails remain without much change. Puddled bars delivered are quoted at from £5 10s. 6d. to £5 12s. 6d. per ton.

Makers of manufactured iron are very poorly supplied with work, and there is a good deal of uneasiness in the finished iron and engineering trades as to the course of action that will be taken in regard to the labour and wages question, lock-outs of the men being talked about.

THE COAL AND GENERAL TRADE OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

A considerable class of steam coals were reduced 1s. per ton last week, and it is every way probable, as stated in this column, that there will be a call upon the quoted rates of best qualities in the beginning of October. The coal trade generally was slacker last week. There was a falling off of shipments at the Tyne Dock, notwithstanding a good few cargoes are still being consigned to the Continent. There is no improvement in local industry. The winter prospects are far from satisfactory, and these continue to have a very depressing effect upon the coal trade. So long as second-class qualities of coals of all descriptions are so abundant, and are being pressed into the market, no other sorts can expect an advance. Besides, the better qualities of north country coals continue to be subjected to a very keen competition from the Welsh mines. Under these circumstances, notwithstanding the fact that we are another week nearer the winter, and that the business to the distant ports of the Baltic must soon terminate for the season, the prevailing tone of the coal trade is flat. The collieries continue to work irregularly, and as a rule the pitmen about them are in excess of the requirements of the trade.

During last week there were very good arrivals of handy coasting sailing vessels. Orders were in the market waiting their arrival. A number of sailing ships were, therefore, taken up for the by-ports; and, though the supply of sailing tonnage was a trifle in excess of the immediate requirements of the trade, the advance of the previous week upon coasting freights was fully maintained. A small fleet of sailing ships, of from 10 to 15 keels each, are at Newcastle Quay discharging grain from the east coast. They will be ready to load coals at the latter end of this week. So that, upon the whole, it may be expected that a good steady business will be done in the shipment of coasting orders for gas and household coals. There is a number of coasting steamers in the coal ports at present. They are decidedly more than the trade requires. Great difficulty is experienced in fixing steamers for London. Rates are very moderate, and are likely to continue so until the end of the month. There is a little more activity to Hamburg, Holland, and France, and to the northern ports of the latter-mentioned country there has been an advance of about 5s. per keel upon freight. Mediterranean business continues to be extremely dull.

On account of the rapid approach of the close of the navigation season, buyers in the Cleveland iron district are willing to pay a higher price for early delivery of pig iron, and, as stocks have been reduced, prices last week had a tendency to stiffen. But there is no improvement in the finished iron trade, and, until there is, it cannot be anticipated that the business in the Cleveland district will improve very materially.

In the general manufacturing trade chemicals were weaker last week, and, notwithstanding the tolerably active shipments, and the fact that there are no heavy stocks on hand, manufacturers did not take a very lively view of the prospects of the trade. Wages are considered to be much too high for the present state of business, and, except in the article of coals, there is no reduction upon the raw material. The fire-clay and fire-brick trade of the Tyne seems to be as active as ever, but the iron shipbuilding trade is becoming duller.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

The most prominent event of recent occurrence in gas matters in Scotland is the seventh half-yearly meeting of the West of Scotland Association of Gas Managers, which was held at Stirling last week, under the presidency of Mr. William Dunlop, Hamilton Gas-Works. I need not anticipate your official report of the proceedings, but will simply mention that the Malam system was again up for discussion, but in the absence of the patentee, a strong feeling was expressed in favour of a deputation from the association going to Dumfries, to give the system a thorough trial over two or three days. I understand that a similar feeling is entertained by some of the leading members of the North British Association of Gas Managers.

In only two instances, I believe, did the gas agitation, commenced a number of years ago, produce any marked effect in Scotland—namely, Lanark and Denny. A second gas company was started in each of those places, but in neither of them is there now any more than one in existence. It is some time since the two became one at Lanark, and more recently the old company at Denny "caved in." The result, in the latter case, is that part of the district of supply is in darkness, owing to the fact that the pipes of the new, or Consumers Company, are not extended into it. Henceforth there is some prospect that the holders of gas stock in Denny may get some dividend at least, as they have hitherto had to content themselves with paying out and not receiving.

On Wednesday last a meeting of the Dundee and Broughty Ferry Gas Commissioners was held, when it was resolved that the Dundee Gas Commissioners should purchase the distributing gas-mains in the Broughty Ferry district, after the managers of the two commissions had made a valuation of the same. There is a prospect of the whole of the Broughty Ferry gas supply falling into the hands of the Dundee Gas Commissioners.

An effort is being made by the directors of the gas company of Johnstone to induce the Police Commissioners of that burgh to agree to the system of placing a meter in every street, for the better determination of the amount of gas consumed. The matter has been remitted to the Lighting Committee of the Police Commission.

The Arbroath Gas Commission met last Monday, when the Provost said he regretted that they had to levy an assessment this year, but he hoped it would be the last time they would have to do so. Owing to the increased area, however, the sum required would be covered by a rate of 2¼d. per pound, and he moved that that be the rate in aid. Their new manager would commence permanent duty immediately; indeed, he was already in the town.

The movement commenced some time ago in Edinburgh for the purpose of transferring the gas supply into the hands of the Town Council is making some progress. At a meeting of the Lord Provost's Committee, held on Friday, there were submitted a number of reports, from which the committee hope to be able to judge of the terms of transfer. They are to be condensed into a single report, from which the gist of the matter of which they treat may be the more readily and clearly arrived at.

At the last meeting of the Town Council of Renfrew, the Gas Committee's minutes were submitted, which recommended that the discount allowed to large consumers be reduced from 7½ to 5 per cent. After a long discussion, the recommendation was agreed to by a majority of eight votes to five. One of the speakers said that the supplying of gas by the Town Council had been a losing concern to the burgh. It might be said that they had lost about 20 per cent. for the last few years. He was not afraid of any of the large consumers commencing to manufacture for themselves; some had already tried, but had failed to supply themselves with gas at a profit.

The directors of the Montrose Gas Company have fixed the prices for supplying the street-lamps with gas for the current year as under—namely, for one-hole jets (4 inches flame) 5s. 6d. per 1000 hours burning; for flat flames (patent jets), 13s. per 1000 hours burning; each description of burner to be the same as the specimens furnished for the approval of the company's manager, and on the usual understanding that the company are to be entitled to make a propor-

tional increase of charge should the lights be found exceeding the dimensions fixed, or if found burning beyond the time, to be reported at the police office.

On Saturday, the 11th inst., half a dozen shares of the Auchterarder Gaslight Company were disposed of by public auction, at sums little short of £8 each. There were also sold six 50s. shares of the same company's stock at nearly £8 a pair. Subsequently eighteen 12s. 6d. shares were sold at nearly £6 per lot of six shares. A hundred £1 shares of the Dunning Gaslight Company were similarly disposed of in lots of twenty shares, at from 11s. to 15s per share. The first-named company declared a dividend of 7½ per cent. in August, and the Dunning Gaslight Company's last dividend was 2¼ per cent. Both companies look forward to improved dividends for next season, and the Dunning shareholders expect great success, and even fabulous dividends, if the long-expected "find" of coal should be made in the vicinity of the town.

The Gas Committee of the Aberdeen Town Council reported at the last meeting of that body that 114 Aberdeen Gas Annuities had been purchased on account of the contingent-fund provided for by the 123rd section of "The Aberdeen Municipality Extension Act, 1871"—the total cost, including expenses, being £689 13s. 1d. The committee recommended that the sub-committee should be authorized to borrow temporarily a sum not exceeding £5000 in connexion with the gas undertaking, on such terms as they might consider most expedient. The recommendation was approved of.

At a cost of £1600 or thereby the people of Aberfeldy, in Perthshire, have provided themselves with an abundant supply of good water from the Moness Burn, and that well-known village is now far ahead of most places of similar importance throughout Scotland, both as regards water supply and drainage. The works, which are very complete, were formally opened on Friday, the 10th inst., by the Countess of Breadalbane.

The offer of Messrs. Stewart and Creber, Dundee, to execute the new water-works for Cambuslang, has been unanimously accepted by the local authority. This addition to the water supply will cost, including land, about £5000, and when finished will ensure a supply of pure water sufficient to meet the wants of this rising village for many years to come. The contractors are bound under the most stingent terms, and a heavy penalty, to have the works completed within six months.

Forfar and Dunfermline are both in a perfect ferment just now on the water question. Many of the ratepayers in the first-named town are opposed to the scheme of the Police Commissioners, while in Dunfermline upwards of 2000 ratepayers have signed a petition to the Town Council, asking them to go to the Devon for an additional supply.

Pig iron has been a good deal firmer in price for several days past. A number of brands of makers iron have been advanced in price, two or three to the extent of 2s. per ton. As high as from 66s. 9d. to 67s. 9d. was paid on Friday. For several days iron has been going into the warrant stores at the rate of 400 to 500 tons per day.

The coal market has been quiet during the past week, and most of the coal-owners are now abreast of their orders. The demand for shipment at the Clyde ports is very dull. House sorts are more inquired for, but as yet there is no alteration in prices. In several places the colliers have begun to hold meetings to agitate for an advance of wages.

Society of Engineers.—On the 13th inst., the members of this society paid a visit of inspection to the works of the Southwark and Vauxhall, the Grand Junction, and the West Middlesex Water-Works Companies.

Brighton and Hove Gas Company.—In their half-yearly report the directors recommend the declaration of a dividend at the rate of 7 per cent. per annum on the original and A shares, and of 6 per cent. on the B shares.

The Reported Explosion of Gas on Shipboard.—We regret to state that there has been no intelligence of the crew of the screw steamer *Martin Weiner*, which left the Tyne on the 31st of August, bound for Hamburg, and has not since been heard of. There is every reason to believe now that they are all lost. There will be a Board of Trade inquiry into the circumstances of the collision, when additional facts may come out.

Manchester Exhibition Medals.—The jurors of the "Exhibition of Appliances for the Economy of Labour," for 1875, held at Manchester, have awarded to Messrs. Leoni and Co. the "gold medal" for their collection of atmospheric gas apparatus, comprising their new kitcheners, for roasting baking, &c., steamers, bath boilers, heating and ventilating stoves, ornamental drawing and dining room fire-grates, and other gas apparatus, for their novelty, design, workmanship, and utility. The jurors have also awarded a silver medal to Messrs. Geo. Glover and Co. for gas-meters and gas apparatus.

A Lap-Welded Tube Trophy.—At the recent Bunker's Hill celebration in Boston, the National Tube-Works Company were represented by some fine specimens of lap-welded wrought-iron tubing, drawn by six large black horses on a waggon tastefully draped with bunting. The tubing, some of the specimens of which were very large, was effectively arranged to represent a cannon on a gun-carriage. The carriage was made of tubing, six sections on a side, the cannon being represented by a section of lap-welded tubing, 12 inches in diameter, said to be the largest manufactured in the world. On each of the tubes of which the carriage is composed is the name of one of the original thirteen States, and on the large tube representing the big gun was inscribed: "Massachusetts, 1775—Our Union Welded, 1875."—*Scientific American.*

Serious Accident at Saltley Gas-Works.—The *Birmingham Daily Mail* of Friday last says: "A serious accident occurred this morning, shortly before noon, at the works of the Saltley Gas Company. Messrs. Horton, of Etna Works, Smethwick, have in hand the work of a new gasometer for the company, and this morning two men, named Thomas Webb and Thomas Walker, with the son of the foreman, named Watson, were engaged rivetting the side of the gasometer. They were on a scaffold swung by ropes from supports at the top of the building, when, without the slightest notice, the knots of one of the support ropes began to draw, and the next minute the three men were precipitated below, a distance of about 18 feet. They were taken to the General Hospital, where it was found that Webb was suffering from fracture of the ribs, and Walker a compound fracture of the elbow, with other injuries. Strange to say Watson escaped with a slight shock.

Epsom and Ewell Gas Company.—Amongst other improvements made by the Right Hon. the Earl of Egmont, at Nork House, is the introduction of gas, not only for lighting the grounds, the magnificent carriage drives, the stables, and mansion, but for culinary and cooking purposes in a very extensive manner. To obtain the gas was a matter of some importance, as part of the Downs are situated between "Nork House" and Epsom town, so the distance to bring the pipes was of a considerable length—nearly three miles. The directors of the Epsom and Ewell Gas Company were communicated with by his lordship's agents, Messrs. Trollope and Sons, of London, and the matter was carefully considered by them and their manager, when it was agreed to supply under an agreement likely to be beneficial to all parties without any detriment to the town consumers. Upon the agreement being signed by the earl and the chairman of the company, G. Stone, Esq., of Ewell, the work was proceeded with, and completed successfully by having a general supply of excellent gas in abundance on Monday, which gave great satisfaction to all concerned. The new main and other necessary alterations were by Messrs. A. C. Fraser and Co., Telegraph Street, City, E.C. The large meter is one of Warner and Cowan's patent. The whole design and work were carried out under the able and practical directions of Mr. R. K. Moorhouse, the very efficient manager of the gas company.—*Surrey Advertiser.*

Barking Public Lighting.—The Local Board of Barking, in consequence of their inabilty to come to terms with the gas company, have unanimously resolved to light the town by means of mineral oil.

Bodmin Public Lighting.—At the Town Council meeting on the 14th inst. the question of lighting the streets was under consideration. At the previous meeting the offer of the gas company to light the 59 public lamps, from September to April, for £130, was sent back for reconsideration, and their reply was now received. The company said they were unable to reduce the amount of their tender, and they stated that in 1874 they did not increase it, although coal was so dear, because they had a stock on hand. The number of lamps had been increased within the past four years from 54 to 59, and the council were asked to pay only £5 more now than in 1871, although coal was very much dearer. The tender was unanimously accepted.

Gas Wells of Pennsylvania.—There is little doubt that the gas escaping constantly from oil wells is of nearly or quite as much value as the oil itself; and it is a matter of wonder that means have not long since been adopted to utilize this immense product of the earth. No estimate can be made of the quantity of this gas, which has for years been allowed to pass away into the air uselessly; but the yield of a few gas wells which have been tubed, and their product utilized, indicates that it is enormous. A gas well near Sarversville, in the Butler oil region, flows with a pressure of 300 lbs. to the square inch, and is roughly estimated to yield a million cubic feet of gas every 24 hours; and this is only one of quite a number of large gas wells, and almost numberless small ones, for it must be remembered that every well which produces oil also yields gas. A survey has just been completed for a line of pipe from Sarversville to Pittsburgh, a distance of about 17 miles. It is proposed to lay a 6-inch pipe between the points named, and to supply the gas to manufacturing establishments as a substitute for coal for fuel in Pittsburgh.—*National Oil Journal U.S.A.*

Salford Corporation Gas-Works.—Appointment of New Manager.—At the last meeting of the Salford Town Council, the following resolution was brought up from the General Gas Committee:—"That Mr. Samuel Hunter, engineer and manager of the corporation gas-works, Rochdale, be appointed engineer and manager of the gas-works of the borough, at a salary of £500 per annum; that he do devote the whole of his time to the duties of his office, such duties to commence on Sept. 15 next, and that the engagement be determinable at any time upon three months notice in writing." Mr. Sharp (the chairman of the Gas Committee), in moving the adoption of the recommendation, said that Mr. Hunter was selected out of 43 applicants, and the resolution for his appointment had been passed by the committee unanimously. Alderman Jenkins seconded the motion, and said he thought Mr. Hunter would prove to be a thoroughly efficient man, and one upon whom they could entirely depend. The corporation were very sorry to lose him at Rochdale but their loss would probably be a gain to Salford. The mayor quite concurred in the selection of the committee, and the motion was carried.

Impure Gas at Exeter.—During Tuesday and Wednesday nights last, gas consumers in Exeter experienced considerable annoyance and discomfort. The gas-burners emitted a most sickening stench, which increased in intensity until the lights were extinguished. In the majority of cases the consumers seem to have imagined that the abominable odour proceeded from a drain, and, therefore, did not adopt the remedy of turning off the gas. The members of our own staff suffered severely from the effluvium, and were scarcely able to continue their work during each night. Representations were made yesterday to the manager of the gas-works, and we understand that, on examination being made, a defect was discovered in one of the valves of the purifying apparatus, which defect allowed the admission of impure gases into the gasometer, and thus supplied the houses, shops, and warehouses of the city with the disgusting odour. The defect has been remedied, and last night the nuisance was somewhat abated, and to-day will disappear, we are assured; but consumers will do well to substitute fresh water for that which is tainted in their gas-meters.—*Exeter and Plymouth Gazette.*

Dover Gas Supply.—At the meeting of the managing committee of the Dover Town Council, acting as the Urban Sanitary Authority, on the 16th inst., the following letter was read from the gas company, on the purity of the gas supply, as follows:—"Sept. 11, 1875.—Dear Sir, I am instructed by the directors of the Dover Gaslight Company to reply to your letter of the 10th inst., asking when the alteration, recently ordered at their Buckland works, will be effected, and if the directors consider they will be effectual in preventing any re-occurrence of the periodical nuisances alleged to be now arising from the works. I am to say that the scrubber having been out of action during its enlargement, the purifiers recently emptied, the two which are now in use have become more highly charged with offensive gases than usual, and consequently the exhalations from them, when uncovered, are unavoidably stronger than they would otherwise be; but that the directors are advised by their consulting engineer that their works are now fully adequate for the manufacture of gas, free from any nuisance or annoyance to the public. In order, however, fully to comply with the wishes of your medical officer, and to remove every possible ground there might be for a suggestion that their works are capable of improvement in that respect, they, at a meeting held on the 2nd inst., determined to consult their engineer as to the construction of two additional purifiers, which they believe will render their works as perfect for the manufacture of gas and the avoidance of unpleasant smells as modern science can make them.—(Signed.) G. Fielding, Secretary, Dover Gaslight Company."

Determination of Magnesia in Drinking Water.—Professor Wanklyn, writing in the *Chemical News*, says: "Since the presence of more than a minute proportion of magnesia in water renders water medicinal, and unfits it for general domestic use, a rapid method of determining magnesia in drinking water is a desideratum. For this purpose the soap test may be resorted to, and I find that by a very simple and obvious procedure the magnesia may be determined with great rapidity and with sufficient accuracy for the purpose. My method of procedure is as follows:—Into a stoppered bottle of the capacity of about a litre, I pour 700 cubic centimètres of the water to be analyzed, and add ·5 gramme of finely powdered oxalate of ammonia. The bottle is then shaken for some half-minute, and presently its contents are poured on a filter. The first portions of the filtrate may be rejected, and 70 cubic centimètres of filtrate may then be submitted to the soap test, and the hardness noted down. If the water to be tested be sufficiently free from magnesia, the filtrate after precipitation with oxalate of ammonia should not require more than three soap measures in order to give a very full and durable lather. Waters charged with magnesia, on the other hand, require much more soap test to produce a full and permanent lather. Those chemists who have had much experience with the soap test are familiar with the fact that the hardness due to magnesia is very different in many respects from the hardness due to lime. It may be useful to point out some of the differences between the behaviour of magnesia and lime towards soap test. In the first place the magnesia hardness, in dilute solutions, is not *equivalent* to the lime hardness. If, for example, a water containing nothing but carbonate of lime be of 13 degrees of hardness, it would not be of 13 degrees of hardness if the lime were replaced by its equivalent of magnesia; but it would be of about 19 degrees of hardness. I find, namely, on experiment, that whereas one equivalent of lime decomposes one equivalent of soap, one equivalent of magnesia decomposes one and a half equivalents of soap. In concentrated solutions magnesia behaves quite differently towards soap test. Another point to be noted is that a certain lapse of time is required for the production of the magnesia hardness, whilst lime hardness is immediate."

Register of New Patents.

3720.—POLLARD, W., and CARTER, J. E., Halifax, "*Improvements in the method of and apparatus for regulating the pressure and supply of fluids and gases.*" Provisional protection only obtained. Dated Oct. 28, 1874.

This invention is applicable in all cases where it is desired to reduce the pressure proportionately from one pipe or vessel to another. The valve being constructed so as to act as a stop-valve when required. It more particularly relates to water-mains in towns, where the pressure is in the first instance high, and varying according to altitude. The constant bursting of pipes under such circumstances causes much waste of water, stoppage of supply, and other inconvenience and expense to the user, and the object of this invention is to regulate the supply in such a manner so as to prevent that inconvenience and expense. The invention is further applicable to water-closets, lavatories, baths, and ordinary water-taps for dwelling-houses, to dye-houses, water-engines, reservoirs, and the regulation of the supply of illuminating and other gases.

This object is accomplished in the following manner:—To an ordinary Mather's or any other suitable valve with one seat is cast or attached a cylinder of larger area proportionately than the valve, in which is fitted a perfectly gas or water tight piston with rod passing through the cylinder bottom and valve cover, and attached to the valve. Upon the cylinder cover, or in any other convenient position, is placed a three-way cock or tap, the smallest size of which is adequate for the largest sized mains. This tap communicates with pipes attached to and communicating with both sides of the valve. When it is desired to make the improved apparatus act as a stop-valve, open the cock or tap communicating with the high pressure side of valve, when the fluid or gas will fill the cylinder at top side of piston and close the valve. When it is required to use the apparatus as a reducing valve, turn the three-way cock or tap opening connexion with low pressure side of valve, when the pressure will lift up valve and piston and pass through pipe communicating with top of piston. When the pressure at low pressure side rises to the pressure the valve is constructed for, the pressure again will act on the top side of piston and close or regulate the valve in the manner described. An air vessel is placed upon cylinder cover or in any other convenient position to prevent a sudden rush of pressure. When the full pressure is required to pass through the valve, the three-way cock or tap is so adjusted as to close the pipes communicating with both sides of valve, and open a communication through the shell of the tap to the atmosphere to allow the pressure at the top side of piston to pass away, when the valve will open and allow an equal pressure on each side of valve, which is of great advantage when the utmost pressure is required for fire and other purposes.

3735.—TYLOR, A., Newgate Street, London, "*Improvements in water-closets, lavatories, and other apparatus relating to sanitary arrangements, and the parts connected therewith; also in the cocks, valves, ball or float valves, hydrants, and apparatus for containing, measuring, controlling, regulating, and arresting the water supply of the same, and for other purposes.*" Patent dated Oct. 29, 1874.

These improvements consist in arranging water-closets so that a full size "Bramah's valve closet basin" may be trapped on the floor line with the ordinary height of seat. In arranging lavatories to be readily accessible for inspection and repair, providing them with quick wastes, and self-closing valves, and so as to be served with one inlet-pipe and one waste outlet-pipe. In arranging hinged ball or float valves so as to be unattached to the ball or float-lever, and so that when closed the strain for keeping the valve on its seat is not dependent on the floating power of the ball or float so as to reduce hammering or oscillation by the balance of pressure or agitation of the water. In arranging hydrants so as to be more convenient in use, and free from damage by frost, by providing means for preventing leakage; and providing draining apertures, which may be closed by projections on the moving part or by passing into the case or body, and so shutting off the passage of the water when in use, and only opening when the valve is closed, to allow the water to drain off. In placing a vessel or chamber in cisterns provided with inlet and outlet valves, only one of which can open at a time, and so that the opening of either closes the other before it can be opened, and fitting an air-pipe to such vessel or submerged valve, so that it cannot act or be made to act as a waste or overflow pipe. In placing the inlet entrance of the water to the meters shown in patents at the bottom or under side of the moving parts in place of at the side, and arranging the connexion to be made with mains under pressure by means of Upward's patent apparatus with a valve or valves, which is or are opened by making the connexion of the service-pipe to the part. In providing sinks with a receptacle which forms its own trap by a division or partition placed in or formed on the same; and placing a grating, slab, or platform over it, which does not touch at the side or sides or at the bottom, but leaves an opening or space all round and under the same, to allow the free passage of the water; and connecting or combining the same with a larger sink, trough, or vessel provided with cocks or taps and the usual appliances. And, lastly, in applying to vertical meters, in which a helix or blade working in a vertical, horizontal, or inclined tube, cylinder, or case is used, fixed or adjustable retarding breaks, in conjunction, if desired, with an adjustable or self-adjusting valve or valves on the inlet part, or either or all separately.

3741.—HOLLANDS, E. R., South Hornsey, and CUBITT, L. W., Islington, "*Improvements in the construction of irons to be heated by gas.*" Patent dated Oct. 29, 1874.

This invention has for its object to improve the construction of irons to be heated by gas-burners contained within them. For this purpose in the body or block of the iron, parallel and close to its bottom surface or face, are formed as many holes as there are burner-tubes to be contained within it, made transversely or longitudinally to the body, by preference they are made longitudinally. In this case they are open at the back end, and pass along the iron nearly to its opposite end; from each hole a slot is made passing in an inclined direction towards the top of the body, where the slots all meet together and form an open chamber. The top is covered over by a plate, in which a hole is formed, through which the products of combustion may pass away. Into each of the holes is inserted a metal tube with a row of perforations along it to form a gas-burner. To the end of the iron is affixed a chamber connected by a flexible tube with a gas supply pipe, and from this chamber gas passes to each of the burner-tubes contained within the iron.

Above the cover plate of the top of the iron, and at some distance from it may be carried a plate of non-conducting material, or a chamber containing non-conducting material, and to the top of this plate or chamber is fixed the handle. The products of combustion from the burners at the lower part of the iron impinge against the sides of the slots, which incline upwards to the top of the iron, and pass out through the hole in the cover plate and escape at the sides between this cover plate and the plate or chamber above it.

By constructing box irons to be thus heated a great extent of surface is obtained, and the bottom or face of the irons is effectually heated without the necessity of employing a blast, as heretofore, to direct gas flames on to the bottom of the iron. The heat imparted to the burner-tubes themselves is also taken up by the metal body, and they thus serve to increase the heating surface of the iron.

3778.—TURTON, S., JOLLEY, W., and BIRCHALL, J. T., Heaton Norris, Lancs, "*Improvements in diminishing valves or apparatus for regulating the pressure of liquids and fluids.*" Patent dated Nov. 2, 1874.

This invention relates to apparatus principally employed to diminish or reduce the pressure of steam, but is also applicable in the construction of apparatus for reducing or regulating the pressure of gas or of other fluids or of liquids. In such apparatus curved hollow springs mounted within chambers are employed, and acted upon by the pressure of steam or fluid, and the springs are connected with valves through which the fluid is admitted within the chambers. The changes of form of the springs arising from variations in the pressure of fluid tend to increase the area of inlet when there is a diminished pressure, and to decrease it when there is an increase of pressure. In an arrangement suitable to be employed to regulate the pressure of steam, the inlet valve is of the equilibrium or double beat form, and is connected to one end of a hollow spring similar in form to the Bourdon spring, the other end being attached to a fixed point. An increase of pressure within the chamber or case tends to compress the spring and thereby to close the inlet valve. An adjusting spring may be employed to act upon the hollow spring to aid in regulating the pressure of steam. And it is preferred to form a passage at the fixed end of the hollow spring for the free ingress and egress of air into and from its interior. The apparatus may be combined with a gauge to indicate the pressure of steam within the chamber, in which case the diaphragm or equivalent part of the gauge is connected with the interior of the chamber by means of a tube to contain water.

3782.—NEWTON, A. V., Chancery Lane, London, "*Improvements in means for lighting illuminating gas, and in fulminating compounds applicable thereto, and for other purposes.*" A communication. Patent dated Nov. 2, 1874.

This invention relates to the use of a fulminate in combination with a hammer or percussion device for lighting illuminating gas, the operation of the hammer and the consequent ignition of the fulminate being effected by the turning of the stop-cock to supply gas to the burner. The fulminate is applied in the form of small beads or pellets to a riband, coiled into a box or magazine attached to the socket of the burner. This box is made with a hinged cover to give ready access thereto, and an opening is made in its upper side for the passage of the riband, which is led upwards to near the burner through a grooved guide, one side of which is an elastic continuation of the side of the magazine, and serves to hold the riband in contact with the feed-wheel. This feed-wheel is keyed to an axle, which is carried by the plug of the stop-cock, and receives its axial motion therefrom. The plug is also fitted with a tapped wheel or cam, the projections on which, when the cam is rotated, act upon a dog situated near the fulcrum of the hammer, and force it outwards against the pressure of a spring, which so soon as the hammer is released will cause it to move forward and strike the pellet of fulminate that has just been brought opposite the hammer-head. The grooved guide extends upwards to form an anvil for the hammer to strike against, and on either side of the hammer-head winged pieces or shields are fixed for guiding up the flame of the exploded fulminate to the top of the gas-burner for the purpose of igniting the gas. The cam of the gas-cock is intended to turn only in one direction, and is furnished with notches, into which the dog of the hammer will fall and check or partly lock the cock against an excessive action.

As an efficient fulminate compound for this purpose, and equivalent uses, the following ingredients are by preference employed—viz., fulminating mercury, black sulphuret of antimony, saltpetre, and French chalk. These are well mixed together in a pulverized state, and the mixture, after being moistened with water to bring it to a semi-fluid state, is deposited in the shape of pellets or beads in regular order of say four to the inch on a riband made of combustible material. When the pellets are dry they are coated with shellac or equivalent varnish to give the cohesion or tenacity.

3784.—VALLE, B. H., Stow-on-the-Wold, "*Improvements in the treatment and utilization of sewage, and in means employed therein.*" Patent dated Nov. 3, 1874.

This invention relates to an improved treatment of sewage, whereby all nuisance is prevented, and valuable and useful products are obtained, the whole of the sewage being effectually utilized. The sewage is collected in filtering-tanks, wherein the solid portion is separated from the liquid, and the latter is effectually defecated and rendered fit for domestic use before being allowed to flow into any river or other channel.

The invention consists more particularly in treating the sewage sludge remaining in the tanks in such a manner as to completely utilize it by converting it into illuminating gas, and a substance capable of defecating sewage, and of being used for other useful purposes.

Two or more series of tanks are provided, to which the sewage is conveyed by conduits so arranged as to effect a gentle flow of the sewage into the tanks, which are so constructed that the sewage as it flows therein is screened and filtered, and the solid matter retained. There are two or more tanks for each series, each tank being divided by partition walls into a number of compartments through which the sewage filters as it flows. The bottom of each compartment also consists of a filtering-bed having an inclined permanent water-tight floor beneath, on which the effluent water drains, and whence it flows through sluices into a suitable channel, in which it may be applied as a source of motive power for use in the works. Over each compartment of the tanks provision is made for the admixture of a small quantity of quicklime, as occasion may require, to accelerate the subsidence of the solid matter of the sewage.

The sets of tanks are intended to be used alternately; that is to say, the fresh sewage is run into the one set whilst the sludge is being removed from the other, and so on.

In order to remove the sewage sludge from the tanks, the filtering-bed is constructed to be raised at one side by a mechanical arrangement, so as to cause the sludge to flow through sluices into a receptacle or bed outside the tanks, wherein it may be allowed to remain exposed to the action of the atmosphere.

Works are erected in convenient proximity to the tanks for the manufacture of the sewage sludge into illuminating gas, provision being made for readily charging the retorts with the sewage.

The gas-works are so arranged that coal gas may first be made in the ordinary way, the resulting coke being used for the purpose of heating the sewage sludge retorts, so that no smoke or other nuisance injurious to health may arise from the whole process. The coal gas is passed through a sewage gas purifier before entering the holder, whereby the quality of the gas is rendered identical with that of the sewage gas which is supplied to the same holder to mix with the coal gas.

The residue in the sewage sludge retorts is of value, inasmuch as it possesses the property of defecating sewage, and in case the whole of the sewage sludge should not be required for the manufacture of gas, it can be used for agricultural purposes, its transport being effected without nuisance by the application of the defecating substance, or the sewage sludge can be manufactured into bricks for building purposes by the admixture of a small proportion of clay with the filtering substance used in the tanks. Or the sewage sludge may be made into cement of good quality by the admixture of lime and a neutralizing substance prepared at the works.

3792.—FOGARTY, T. B., Warren, Mass., U. S. A., "*Improved apparatus for carburetting air or other gaseous bodies.*" Patent dated Nov. 3, 1874.

This invention relates to machines and apparatus for carburetting air or other gaseous compounds or bodies by mixing therewith the rich hydrocarbon vapours derived from the distillation of petroleum or its derivatives, but it refers more particularly to that class of carburetting machines and apparatus in which hydrocarbon vapour formed under pressure in a heated retort is blown at a high velocity through a small jet or opening into the mouth of a larger tube or chamber in such a manner as to induce and carry along with it a large intervening volume of air or other gaseous compound.

3829.—DODGE, J., Eccles, "*Improvements in apparatus for exhausting or forcing air and gases.*" Patent dated Nov. 6, 1874.

This apparatus consists of a vessel divided into two parts by a midfeather; surrounding it is a second vessel, with a space between the two containing water or

other liquid. In this space an inverted vessel is moved to and fro or up and down by steam or other power. In the top of the vessel first mentioned are two or more valves, opening internally and externally, and placed on each side of the midfeather. There are also ingress and egress ports in connexion therewith.

3843.—MARCHANT, R. M., Hatton Garden, London, "*Improvements in the manufacture of gas.*" Patent dated Nov. 7, 1874.

This invention consists in manufacturing gas by the application of heat to a mixture of oil and water, and this is effected by boiling the mixed oil and water, or by first converting the water into steam and then passing the steam into and through the oil. The oxygen of the water or steam, having a great affinity for the carbon of the oil, combines therewith, and forms carbonic oxide in union with the hydrocarbons obtained from the boiling of the surplus oil, leaving the hydrogen of the water or steam free. Highly combustible gases are thus obtained in combination with the liberated hydrogen, which combination of gases may be conveyed through pipes or otherwise, and utilized for heating or illuminating purposes.

When required for illuminating purposes, its lighting powers may be perfected for application at the lowest temperatures by the addition and intermixture of any suitable spirituous or other gas, or by the subjection of the gas to the action of pipes in which a high temperature is effected in any known manner during its passage through them to any holder or receiver.

3859.—HARDING, T., Bristol, "*An improved method of ventilating sewers, shafts, and stacks, and consuming, destroying, disinfecting, or deodorizing the vapour or sewer gas arising from sewers.*" Dated Nov. 9, 1874. Void by reason of the patentee having neglected to file a specification in pursuance of the conditions of the letters patent.

According to this invention a ball or other conductor, composed of fire-clay, lime, metal, or other material, is placed over the orifice of a pipe, for the purpose of conducting the vapour or gas from the sewers. A ring of gas-jets or other burners may be placed round the pipe, either inside or outside, in such a position as to heat the ball or other conductor, so that the flame arising from the jets or burners, and the heat generated thereby, and reflected by the ball or other conductor, may destroy or deodorize the vapour or sewer gas.

3867.—WRIGHT, F., Millbank Street, Westminster, "*Improvements in gas-governors.*" Provisional protection only obtained. Dated Nov. 10, 1874.

This invention relates to governors, such as are employed for regulating the flow of gas to a jet, notwithstanding variation in the pressure of the gas supply, and has for its object the construction of such governors in a more simple and economical manner than heretofore. For this purpose a circular base is provided with a central inlet fitted with a conical valve, which hangs from a cross wire that is passed through slots in the opposite sides of a central tube, and is attached to a flexible diaphragm of leather or other suitable material. This diaphragm is attached by its periphery to a flange projecting upwards from the base, or its edge may be clamped down to the base by means of the cover. From the base a tube projects upwards, passing through a hole in the diaphragm, and is preferably cast in one with the base, having on its opposite sides the slots, through which passes the valve wire. This tube conveys the gas to the burner, which is fixed on the top. It has near the base a collar on which the diaphragm rests, and against which it is tightly pressed by a caoutchouc ring passed over the tube. The diaphragm is covered by a light dome, which can be screwed on to the tube, in which case its edge can be made to press the periphery of the diaphragm against the base; or when the diaphragm is secured to the flange of the base, the dome may be held to the base by two or more lugs passed through notches at the edge of the base, and turned partly round in the manner of a bayonet clutch.

The action of the apparatus is as follows:—Gas entering the inlet has to pass the valve on its way to the burner, and tends to charge the chamber under the diaphragm to a pressure dependent upon that of the supply. When the pressure is excessive the diaphragm is raised, and the wire attached to it rising with it causes the conical valve to close more or less the passage from the supply-tube in such manner as to maintain a pressure uniform, or nearly so, in the chamber under the diaphragm, from which chamber the gas passes by the central tube to the burner.

3868.—MATTHEWS, H., Bristol, "*Improved arrangements and apparatus for removing gases from sewers, and effecting the consumption thereof.*" Provisional protection only obtained. Dated Nov. 10, 1874.

This invention is designed to prevent the introduction of deleterious gases into dwellings and other buildings by reducing the pressure in the sewers, and burning the gas removed therefrom so as to render the same innocuous. To this end communication is established between the interior of the sewer, and suitable orifices or outlets arranged in proximity to the flames of gas-lamps or to other flames, whereby the escape of the sewage gas is promoted, and its consumption is effected. In carrying out this invention there is inserted in or attached to the crown of the sewer a conical pipe, from the upper and narrower part of which a connecting-pipe proceeds to the orifice or outlet near the burner. When utilizing public lamps, the post, being hollow, may be made to serve as a part of the connecting-pipe from the sewer to the burner. The orifice or outlet may be arranged within the ring of an Argand, or somewhat similar burner, so as to cause the sewer gas to pass into the flame; or the pipe from the sewer may terminate in the form of a ring or pipe encircling the ordinary gas-pipe, and provided with orifices arranged to discharge the sewer gas so that it shall come in contact with the flame. The effect of the flame in juxtaposition to the orifices or outlet from the sewer will be to induce a constant current of gas from the sewer towards the burner. A tap or valve is provided in an accessible position near to each burner, so that when or before the flame is extinguished the outlet or orifices from the sewer may be closed.

3876.—FORBES, Rev. G. H, Broughton Rectory, Northampton, "*Improvements in the manufacture of artificial fuel.*" Patent dated Nov. 10, 1874.

This invention is a further development of the inventions for which letters patent, No. 2374 and No. 2822, A.D. 1874, were granted to the present inventor, who now makes use of the compound or compounds therein referred to for the manufacture of fuel. Tar or similar bituminous substance may sometimes be used in these compounds.

3889.—RAMSAY, H. M., Twickenham, Middlesex, "*An improved method of making water-tight joints to stoneware or other pipes.*" Provisional protection only obtained. Dated Nov. 11, 1874.

This invention consists in constructing, forming, and laying grooved butt (in some cases grooved and rebated or half socket) stoneware or other pipes for sewerage works or other purposes, in such manner as to make perfect water-tight joints in the construction of such works.

The body of pipe being formed for the reception of a tongue or ring made of lead, zinc, or other suitable material fitted and fixed in one end of each pipe to be then laid in the usual way, the groove of following pipe is charged or filled with hot bituminous mastic, asphalte, or other suitable material, and then jointed together, or the pipes may be fitted up with a tongue cast in groove in lead, screwed or wedge-shaped at one end, the other being bushed with lead to suit, added to either a half-pipe sleeper and cap-block to be used (if necessary) for bedding on and covering at joint.

3908.—VALENTIN, W. G., Royal College of Chemistry, South Kensington, "*Improvements in the treatment of spent oxide of iron for the purpose of extracting cyanogen compounds therefrom,*" Patent dated Nov. 12, 1874.

The invention has for its object the utilization of the cyanogen compounds often found in the materials employed in purifying coal gas, and known as "spent oxide." Hydrated ferric oxide as it comes from the gas-purifiers contains a considerable quantity of sulphur, and also ammoniacal salts which interfere with the profitable extraction of cyanogen compounds by means of milk of lime, potash, or soda. The free sulphur is acted upon by these strong bases, with formation of soluble alkaline sulphides or polysulphides, whilst at the same time the ammonia is driven off by the action of the caustic alkalies. In order to avoid these disadvantages the inventor employs the washed "spent oxide" and digests it at the temperature of boiling water with carbonate of lime (chalk), or with carbonate of magnesia (magnesite), or by preference with slightly burnt dolomite or magnesian limestone. The insoluble cyanogen compounds which are present in the "spent oxide" consist principally of ferro-cyanide of iron or Prussian blue, and can be decomposed more or less completely by digestion with basic carbonate of magnesia, such as the commercial magnesia alba, or by slightly burnt magnesite, and also by chalk or precipitated carbonate of lime (although more slowly and not quite so perfectly) without the free sulphur being injuriously acted upon. It is preferred, therefore, to digest the finely powdered "spent oxide" after the same has been washed in pans either over open fires or heated by means of jets of steam or coils of steam-pipes, together with slightly burnt dolomite or magnesian limestone, or magnesite. The quantity of burnt dolomite or magnesite necessary for this process must depend upon the per centage of ferro-cyanogen present in the spent oxide, but from 5 to 10 parts by weight will usually be found sufficient.

Slightly burnt magnesite, hydromagnesite, or other suitable magnesia mineral may be advantageously employed instead of dolomite for effecting the decomposition of the ferro-cyanogen compounds. As the presence of iron oxide in magnesite is not objectionable, the cheaper kinds of magnesite may be used. Unburn tmagnesite, or magnesic-carbonate, as it is found in nature acts, but little upon the ferro-cyanogen compounds, even when finely powdered. When slightly burnt it crumbles readily to a fine dust and decomposes them readily. A mixture of magnesic carbonate and oxide, or so-called basic magnesic carbonate, is thus constituted.

When magnesite is ignited strongly and for a sufficient length of time to convert it into caustic magnesia, or nearly so, and the "spent oxide" is digested with it, the inventor has observed that a considerable amount of sulpho-cyanogen is present in the filtrate, and that caustic magnesia, like the other caustic alkalies, acts injuriously, and should therefore be avoided.

The aqueous solution after filtration contains the ferro-cyanogen as ferro-cyanide of calcium or magnesium, or of both, as the case may by, and constitutes a very slightly alkaline liquid of a light yellow colour, and which liquid, on the addition of a small quantity of acid and of a salt or salts of iron, yields a precipitate of prussian blue of a very fine colour, which falls out very rapidly and is easily washed by decantation and filtration.

The process is equally applicable in the case of "spent oxide" from which the soluble salts have been removed by water and the sulphur by extraction with carbon disulphide. The ferric oxide which is then left, and which usually contains some magnesia salt which has not been acted upon, is considerably improved thereby, and can be used over again with great advantage for the purification of coal gas.

3910.—MATHER, W., Salford, "*Improvements in apparatus for measuring liquids, for obtaining motive power, and for exhausting and forcing air and other gases and fluids.*" A communication. Patent dated Nov. 12, 1874.

This improved apparatus consists of three or other convenient number of metallic or other bellows which are in communication with the ingress and egress passages; the bellows are united by the arms of a compound lever, which vibrates in a spherical bearing, and the lower end of the axis of this compound lever communicates a rotary motion to a circular value, while the upper end of the axis gives motion to the index dials or to the motive power or other engine.

3917.—PRESTON, F. P., PRESTIGE, J. T., PRESTON, E. J., and FOWLER, J. A., Deptford, "*Improvements in pumps.*" Patent dated Nov. 13, 1874.

This invention consists in fitting one or more pistons, combined with one or more buckets, in a pump barrel, so that each piston has the effect of a double-acting pump, and each bucket the effect of a single-acting pump, without the intervention of any fixed covers between the pistons or between the pistons and buckets.

3918.—LAKE, W. R., Southampton Buildings, London, "*An improved ratchet-brace or drilling apparatus.*" A communication. Provisional protection only obtained. Dated Nov. 13, 1874.

This invention is designed to afford a more efficient implement than has been heretofore obtained. The important feature is the turning of the drill in the same direction during both the forward and backward movements of the lever or handle of the brace.

3928.—RICHARDS, W., Brixton, Surrey, "*Improvements in instruments for measuring fluids.*" Patent dated Nov. 14, 1874.

These improvements consist in employing a flexible material, as vulcanized or other prepared india-rubber, prepared cloth, leather, or similar substances, in the formation of flexible divisions or diaphragms for the measurement of water or similar fluids, these flexible divisions or diaphragms being in direct action with a crank or cranks, by which means the distance through which the diaphragms pass is controlled and the quantity of liquid in its passage through the meter is defined.

The instrument proposed by preference for the measurement of water is a cylindrical vessel placed in a horizontal position and provided with a base or feet. Within this are two vertical flexible air-tight divisions which divide the vessel into three distinct vertical compartments, the centre one being larger than the others. About the centre of the vessel, and midway between the centres of the diaphragms is a vertical shaft or arbor, having two cranks placed at right angles to each other, which arbor works in a suitable bearing at the bottom, and is supported by and protrudes some distance through a stuffing-box at the top. To the cranks are connected two rods, each of which is in communication with and actuated by its corresponding diaphragm. On the top of the cylindrical vessel are placed two three-port slide valves on the same plane, placed at right angles to each other. The two ports of the valves nearest to the central division are in communication therewith, whilst the other two end ports communicate with the opposite sides of the diaphragms. The centre ports are for the eduction or conveying the liquid away after being measured. On that part of the vertical arbor which protrudes through the stuffing-box is fixed a crank or eccentric, which by means of suitable rods gives motion to the slide-valves. There is also fixed on the arbor a screw or worm working into a toothed wheel or other means for conveying motion to the index, and recording the number of revolutions of the arbor. The capacity of each stroke of the diaphragm or each revolution of the vertical arbor being known, then by simple mechanism the quantity of liquid passing the meter is recorded. The valves and index, and pipes of ingress and egress, are enclosed in or attached to a separate case or compartment in combination with the vessel containing the flexible divisions.

According to another arrangement, instead of placing the two cranks in the centre compartment, it is proposed to place a perpendicular arbor with its corresponding crank in each of the end divisions of the cylindrical vessel, and, as in the former case, their ends protruding through their corresponding stuffing-boxes, and supported by suitable bearings. On the top of each of these arbors is fixed a crank, and these cranks are connected together by a suitable link or rod, so that by the to-and-fro motion of the diaphragms a rotary motion is given to both of the vertical arbors; and on one or both of these may be placed the eccentrics or cranks for giving motion to the valves, also the worm or other means of communicating with the index; or there may be two link-rods

actuating a crank which controls the slide-valves and conveys the action to the index.

According to another arrangement, a meter may be constructed with one diaphragm, this being attached to a rod which passes through a stuffing-box, and by the intervention of an india-rubber spring gives motion to the valve or valves.

In constructing the flexible divisions, although any form or shape may be employed, the inventor prefers large metal discs of rather less diameter than the cylindrical case. The flexible material is arranged as a belt, representing in section one or more corrugations. To one side of this is attached the large disc, and the other side of the belt is attached to a ring, which is secured to the outer case, each diaphragm being somewhat similar in action to the circular forge-bellows.

Another part of the invention consists in forming the cranks in such a manner that the part called the throw is of such diameter that the rod which it actuates can pass freely over the crank on to the throw or the seat for the rod.

To deprive the india-rubber of its odour or the taste it would convey to the water, it is boiled in water for a considerable time, and if necessary within the belt, or on its exterior, suitable rings of gutta percha or other material are placed; and in order to retain the discs in the same plane, lugs are fitted thereon which work against the exterior case.

It is also proposed to employ the direct action of the cranks in connexion with the diaphragms, together with the arrangement of slide-valves, and the general details as described in the construction of dry gas-meters.

3938.—Evans, J., Wolverhampton, "*Improvements in pumps.*" Patent dated Nov. 16, 1874.

This invention refers only to such pumps as work with a bucket, piston, or plunger, and have the length of the stroke regulated by a crank or equivalent forming part of or fixed to a revolving shaft. A peculiar form of piston valve is actuated from an eccentric or equivalent on the revolving shaft, as are also the pump valves, or in the case of two pumps working opposite to each other, the valves for both pumps are actuated from the same eccentric. The action of pumps having piston or slide valves is reversed so that the suction becomes the delivery, and the delivery the suction. This is effected by reversing the revolving shaft, preferably by means of a separate loose eccentric or equivalent on the revolving shaft actuating the steam-valve. The pumps are started by using a loose eccentric and hand wheel for actuating the valves of both engine and pump.

3954.—Bacon, J., Gainsborough, and Searle, H., Hull, "*Improvements in hydraulic pumps.*" Provisional protection only obtained. Dated Nov. 17, 1874

This invention consists in applying a vessel or apparatus to receive the exhaust or discharge, so that it may subside and return smoothly into the tanks, and not allow the pumps to discharge directly into the tank, as is done in the usual way. By this application a more steady working of the pumps and a more even pressure is maintained. To carry out this improvement, a vessel or other apparatus i placed to the under side of the pumps on a suitable stand; or it is attached by other means to catch or baffle the force of the exhaust or discharge therefrom, so that the discharge does not agitate the liquid in the tank or cistern and cause the pumps to work irregularly and not maintain an even pressure. A pipe or spout is applied to the vessel or apparatus to convey the discharged liquid into the tank or cistern, so that the liquid in the tank or cistern will not be agitated or forced from the pump feed-pipe.

3988.—Walker, W. T., Highgate, "*Improvements in the construction of gas-purifiers.*" Patent dated Nov. 20 1874.

This invention consists in an inproved construction of gas-purifiers, whereby the planing or surfacing the joints or flanges of the plates composing the purifier is facilitated.

Hitherto gas-purifiers have been constructed of separate iron plates bolted together, a certain number of such plates being taken to form the bottom of the purifier, and a certain number to form the sides of the purifier, the number varying according to the size of the purifier; and around the periphery of the upper part of the side plates a cup or lute was formed to contain water, which formed the seal or water-joint of the purifier cover. The plates thus forming the bottom, sides, and water lute of the purifier have heretofore been bolted together by means of flanges, with bolts, nuts, washers, and grummets, and the spaces between the flanges have been caulked up with iron cement. This method of construction is attended with many defects. The plates forming the purifier frequently crack and break from being much strained by the unequal drawing together of their uneven flanges by the bolts and nuts, and afterwards in doing their work the purifiers are exposed to contraction and expansion from the different degrees of temperature of the gas entering them for purification, as well as from the chemical action set up in the purifying materials themselves; thus it is not an uncommon occurrence in gas-works, after a brief period of usage, for many of the plates to be cracked and broken. The requirements of modern purification also render it necessary that the lime used should remain a much longer time in the purifier than heretofore,—*videlicet*, frequently a month,—and a condensed liquor is formed thereby which is destructive to the cemented joints, which soon become leaky and cause great waste of gas.

By these improvements the patentee is enabled to plane the surfaces of the flanges of the plates in an easy and effective manner and at a reduced cost.

In carrying out the present improvements, in forming the bottom of the purifier, the patentee makes the plates of which it is composed all of similar form and dimensions, and casts a recess flange all round the plates at right angles to them, making the flanges project either above the plates in the bottom of the purifier, or below the plates under the bottom of the purifier, the recess flange being formed by casting two projections upon and around the surfaces of the flanges, one of the projections being about 1 inch to 1½ inch wide, and the other round the outer part of the flange of a less width. The flanges of the bottom plates being thus recessed, the surfaces only of the projections require to be planed or surfaced. By this means the labour and expense of planing the entire surface of the flanges, which would otherwise be necessary, is avoided. It also causes the flanges to have an equal, firm, and true bearing all round.

The bottom plates of the purifier being made all of one form and size, with their flanges planed or surfaced square and true, require in erection simply to be laid down level and screwed up to come together true, and be ready to connect the side plates.

The side plates of the purifier are cast with solid water-lute cups, and the side plate and cup made all in one piece, instead of, as by the usual method, the cup and water-lute being cast separately from the sides, the expense of planing and surfacing which is too great in practice.

The flanges of the side plates also, like the bottom plates, have two projections so as to form recess flanges, which are planed or surfaced.

The lower part of the side plates has a similar recess flange on the internal face of the plate, so as to form a joint with the bottom plates. The object of this improvement is to enable the whole of the flanges of one side plate to be planed with only one fixing or chucking. For this purpose the side plates, forming the corners of the purifier, are also make rights and lefts, and the plate and water-lute are formed in one piece, with the side of it facing at right angles, so as to be joined to the other side plates, and form the corner of the purifier without any separate or special corner casting.

The outlet of the purifier is formed separately from the side of the purifier, such outlet having a recess flange planed or surfaced, and connected to the bottom of the purifier by a similarly planed or surfaced joint. This improvement enables the outlet to be conveniently fixed in any part of the bottom of the purifier at any required distance from the inlet, thus saving the labour and expense and avoiding the former tendency of the cast-iron outlet-box to leak by the effect of contraction and expansion when bolted to the sides of the purifier.

APPLICATIONS FOR LETTERS PATENT.

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3048.—Gosling, L., Kilburn, and Gluckstein, L., Westbourne Park, London, "Improvements in apparatus for lighting gaseliers or street-lamps." Aug. 31, 1875.

3058.—Pinnington, G., Liverpool, "Improvements in pumps." Aug. 31, 1875.

3070.—Lake, W. R., Southampton Buildings, London, "Improvements in liquid-meters, which may also be used as pumps or motor-engines." A communication. (Complete specification.) Sept. 1, 1875.

3071.—Bayford, W J., Bombay, "Improvements in hydraulic pumps, and in the action thereof." Sept. 1, 1875.

3102.—Carter, H., Manchester, "Improvements in gas-fittings and burners." Sept. 4, 1875.

3137.—Young, W., Clippens, Renfrew, "Improvements in obtaining hydrocarbon vapours from gases, and in the apparatus employed therefor." Sept. 7, 1875.

3143.—Lake, W. R., Southampton Buildings, London, "An improved engine to be operated by steam, hot air, or water, and which may also be used as a pump or a fluid-meter." A communication. Sept. 7, 1875.

3157.—Grave, J., Manchester, "Certain improvements in water-closets." Sept. 8, 1875.

3162.—Clark, A. M., Chancery Lane, London, "Improvements in treating sewage and other impure or polluted waters." A communication. Sept. 8, 1875.

3179.—Wise, W. L., Adelphi, London, "Improvements in apparatus for purifying illuminating gas." A communication. Sept. 10, 1875.

5188.—Shanks, A. F., Barrhead, Renfrew, "Improvements in and connected with water-closets, urinals, cisterns, baths, valves, and other apparatus in which water is consumed, contained, conveyed, or controlled." Sept. 11, 1875.

3189.—Comber, W. A., Birmingham, "Improvements in ratchet braces, which invention is also applicable in converting motive power from reciprocating to intermittent rotary motion." Sept. 11, 1875.

3199.—Williams, W., Liverpool, "Improvements in laying and joining pipes and tubes for tunnels, water and gas pipes, pneumatic tubes, and similar purposes." Sept. 13, 1875.

3205.—Spencer, W. H., Brooklyn, New York, "Improvements in the manufacture of illuminating gas." Sept. 13, 1875.

3220.—Whitaker, J. W., Wakefield, "Improvements in apparatus for charging gas-retorts." Sept 15, 1875.

3221.—Crossley, F. W. and W. J., Manchester, "Improvements in gas motor-engines." Sept. 15, 1875.

3237.—Adams, J., Hamilton, Lanark, "Improvements in charging vessels or receivers with condensed or liquefied gas, in liberating the same therefrom, and in the means employed therefor." Sept. 16, 1875.

GRANTS OF PROVISIONAL PROTECTION.

2880.—Paterson, R. O., and Brothers, F. W., Cheltenham, "Improvements in obtaining salts of ammonia." Aug. 16, 1875.

2884.—Wirth, F., Frankfort-on-the-Maine, "Improvements in water-meters." A communication. Aug. 16, 1875.

2888.—Packer, O., Westminster, London, "Improvements in double-slide box cocks." Aug. 17, 1875.

2905.—Duckham, H. A. F., Holloway, London, "Improvements in gas-regulators, more especially applicable for regulating the supply of gas to the burners of railway and tram carriages." Aug. 18, 1875.

2912.—Foster, J. K. J., Wakefield, "Improvements in apparatus and appliances for raising liquids and fluids, the same being applicable as auxiliary motive mechanism for various purposes." Aug. 18, 1875.

2927.—Fletcher, T., Warrington, "Improvements in gas and other furnaces." Aug. 20, 1875.

2930.—Steel, J., Glasgow, "Improvements in drawing retorts, and in the machinery or apparatus employed therefor." Aug. 20, 1875.

2961.—Tongue, J. G., Southampton Buildings, London, "Improvements in rotary steam, air, or gas engines." A communication. Aug. 23, 1875.

2986.—Mallinson, J., Welwyn, Herts, "Improvements in cocks and in sluice and slide valves to regulate the flow of steam, water, and other fluids." Aug. 25, 1875.

2989.—Dubois, J. L., Clapham, London, "Improvements in cocks or taps." Aug. 26, 1875.

2994.—Beach, H., Brighton, "Improvements in taps known as high-pressure water-taps." Aug. 26, 1875.

3010.—Bonneville, H. A., Paris, "Improvements in the manufacture of gas for lighting and heating, and in the apparatus connected therewith." A communication. Aug. 27, 1875.

3019.—Weyhe, W., Bremen, Germany, "Improvements in motor-engines worked by steam, air, gas, or other fluid, also partly applicable as pumps or blowing engines." Aug. 27, 1875.

NOTICES TO PROCEED.

1621.—Haigh, B., Cubitt Town, London, "Improvements in cocks or valves." May 1, 1875.

1625.—Pape, T., Nottingham, "An improved method of and apparatus for filtering and deodorizing sewage so as to prevent rivers being polluted thereby." May 3, 1875.

1693.—Popoff, M. A., St. Petersburg, "A new or improved ventilating, disinfecting, and deodorizing cover for water-closets, privies, urinals, night commodes, and other like utensils, also generally applicable to the disinfection and deodorization of fœtid or noxious gases and emanations." May 6, 1875.

1790.—Jameson, J., and Schaeffer, A. G., Newcastle-upon-Tyne, "Improvements in centrifugal pumps." A communication. May 13, 1875.

1848.—Clark, A. M., Chancery Lane, London, "Improvements in the method of impelling, conducting, or forcing air by the influence of a jet of air or steam, and in applying the same to various purposes." A communication. May 19, 1875.

2772.—Mills, B. J. B., Southampton Buildings, London, "Improvements in liquid-meters." A communication. Aug. 5, 1875.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

902.—Carey, R., Southwark, and Porter, R., Fenchurch Street, London, "Improvements in valves for regulating the flow or discharge of gas, water, and other fluids." March 11, 1875.

1038.—Versmann, F., Camden Town, London, "Improvements in the manufacture of colouring matters." March 20, 1875.

1200.—Breeden, J., Birmingham, "Improvements in sliding chandeliers and gaseliers." April 3, 1875.

1374.—Howard, J., Nunhead Lane, Surrey, "Improvements in apparatus for supplying disinfectants for disinfecting water-closets, and for other purposes." April 15, 1875.

2492.—King, T., Langley, Worcester, "Improvements in direct-acting steam-pumps." July 10, 1875.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION has been AWARDED to

GWYNNE & BEALE'S PATENT IMPROVED GAS-EXHAUSTERS,

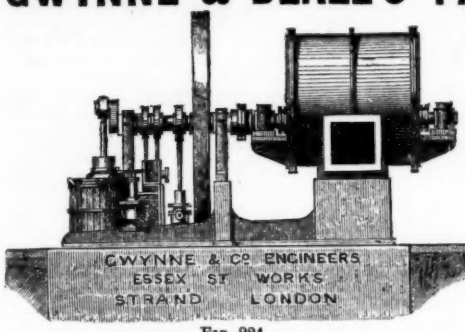


FIG. 224.

The BEST EXHAUSTERS IN THE WORLD.

Made under the personal superintendence of

Mr. BEALE,

The oldest Maker, Inventor and Patentee of

GAS-EXHAUSTING MACHINERY.

(It is NOT CORRECT to state that Mr. BEALE has RETIRED.)

Prices and every information on application.

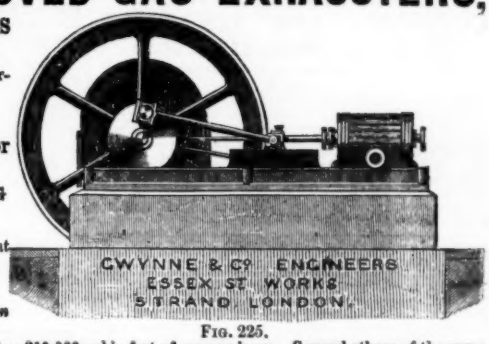


FIG. 225.

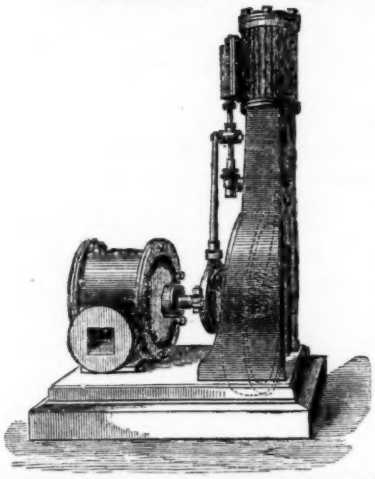
Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. Several others of the same size are now on order for the same Company. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the **most perfect system of action yet discovered.** Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. GWYNNE AND Co. *do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality, and the most approved design and arrangement.* Their prices have been estimated with a due regard to the **excellence of the article produced,** and when this is taken into consideration, they have no fear for the result. The orders executed this season for Exhausters and alterations to their patented system amount to over 4,000,000 cubic feet of gas passed per hour, and to over 300 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction. Numerous testimonials and references can be given.

REGULATORS, BYE-PASSES, STOP-VALVES, GAS-VALVES, & MACHINERY FOR GAS MANUFACTURE, OF ALL SIZES, CAN BE HAD ON APPLICATION TO

GWYNNE & CO., HYDRAULIC & GAS ENGINEERS, ESSEX STREET WORKS, STRAND, LONDON, W.C.

G. & Co. are now manufacturing for a London Gas Company three of their 210,000 cubic feet Patent Gas Exhausters, and many of all sizes.

BEALE'S IMPROVED PATENT GAS-EXHAUSTER



WITH

ENGINE COMBINED

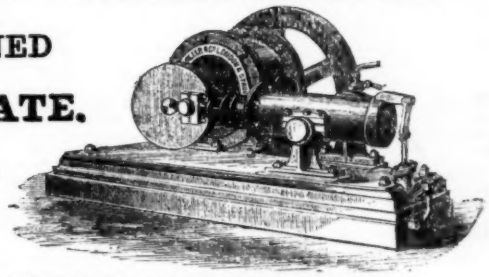
ON

ONE BASE PLATE.

SOLE MAKERS,

GEORGE WALLER & CO.,

Who, since Mr. BEALE'S retirement, are the Oldest Makers.



EXHAUSTERS with HORIZONTAL ENGINE combined.
EXHAUSTERS with OUTSIDE BEARINGS.
MAKERS of ENGINES, BOILERS, and GAS MACHINERY.
TAR, LIQUOR, and SYPHON PUMPS. GAS-VALVES in stock, 2 to 30 inches.
SELF-ACTING BYE-PASS VALVES, with Lid and Relieving Lever.
MANN'S and many other descriptions of WATER DISTRIBUTORS.
SCRUBBERS, PURIFIERS, and CONDENSERS.
EXHAUSTERS from 3000 to 60,000, new and second hand, in stock.

PHŒNIX ENGINEERING WORKS, HOLLAND STREET, S.E., & at STROUD, GLOUCESTERSHIRE.

D. BRUCE PEEBLES & CO.,

ENGINEERS,

FOUNTAINBRIDGE WORKS, EDINBURGH,

MANUFACTURERS OF WET AND DRY GAS-METERS;

Patentees and Sole Manufacturers of PEEBLES' LAMP-GOVERNORS,

ABOVE 30,000 OF WHICH ARE NOW IN USE.

"These Lamp-Governors are so superior that they are likely to supplant all others."—*Dr. Wm. Wallace, F.R.S., F.C.S.*

D. BRUCE PEEBLES AND CO., FOUNTAINBRIDGE WORKS, EDINBURGH.

WANTED, a situation as Gas Stoker. Understands the working of an exhauster, clay and iron retorts. Will be at liberty on October 6.

Apply to JOHN COWELL, Kirkby Stephen Gas-Works, Tebay, WESTMORELAND.

TO GAS WORKERS.

WANTED, a steady, competent Man to take sole CHARGE of small works, where the annual make is about 800,000 feet.

Apply, stating terms, to SECRETARY, Gas Company, Castle Cary, SOMERSET.

WANTED, by a thoroughly practical Manager, a similar SITUATION, where the make of gas is not less than 16 millions. Has held the last situation 20 years. First-class testimonials and references.

Address No. 195, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a respectable youth as ARTICLED PUPIL or Apprentice to a Gas Engineer, who has for many years had charge of large works in the provinces, where every facility for learning both theory and practice will be afforded. One who has a general knowledge of, or has gone through a course of chemistry preferred.

A moderate premium will be required, and a small salary to commence.

For further particulars address No. 201, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Gas-Meter Tester. Must be thoroughly acquainted with testing and repairing of Wet and Dry Gas-Meters.

State age, wages required, and send references, to No. 200, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, the Management of a Gas- Work, where a day stoker is kept preferred. Understands engine and exhauster, laying mains, services, and fixing meters, &c.; or as an Assistant Manager of a large Gas-Work.

Address No. 191, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Advertiser, a situa- tion as MANAGER and Collector of small, or Assistant Manager of larger, Gas-Works. Well acquainted with manufacture of gas, laying mains and services, and taking meters, and is a first-rate collector of accounts.

Address E. H., care of Mr. Harris, 10, LAURENCE POUNTNEY LANE, E.C.

WANTED, by a young Man, aged 27, a situation as METER INSPECTOR, or as Foreman Gas-Fitter. Has a first-class experience of gas-fitting in all its branches. Willing to make himself generally useful under the direction of the Engineer of a Company. Is respectably connected, and can give security if required. Good references.

Address No. 199, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED immediately, a competent Man as MAIN and SERVICE LAYER, Smith, Gas-Fitter, and to do the mechanical work of a Gas-Work. One used to exhauster. References required.

Apply, by letter, stating age, wages required, &c., to Mr. J. H. SILCOX, Manager, Gas-Works, Pembroke Dock, SOUTH WALES.

WANTED, by the Advertiser, a re- engagement as MANAGER or Assistant. Has had 12 years practical experience in the manufacture and distribution of gas; also main and service laying, testing the illuminating power, &c. Good testimonials. No objection to go abroad.

Address No. 197, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, at a provincial Gas-Work, a handy man to act as NIGHT FOREMAN during the winter. Must make himself generally useful for the remainder of the year. Make 120 millions per annum.

Apply, by letter, stating age, wages required, present occupation, and reference, to No. 196, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

STATION-METER, second-hand, for SALE, in good condition. Capable of passing 8000 feet per hour, together with bye-pass, valves, and connexions complete. To be sold to make room for a larger one.

Apply to Mr. C. TURNER, Manager, Gas-Works, Ravensthorpe, MIRFIELD.

NEW EDITION, NOW READY,
ADVANTAGES OF GAS FOR
COOKING AND HEATING.
By MAGNUS OHREN, A.I.C.E., F.C.S.
For Companies to issue to their Gas Consumers.

Specimen Copy by post Threepence, direct from MAGNUS OHREN, Gas-Works Lower Sydenham, London, S.E.

THE Llanelly Gaslight Company desire to secure the services of an experienced practical MANAGER, accustomed to the manufacture and distribution of gas. Present make 17 millions, rapidly increasing.
Apply, stating salary required, to Mr. JOHN POWELL, Secretary, Llanelly, SOUTH WALES.

THE Advertiser desires some one to join with him in ERECTING GAS-WORKS in three towns, from 3000 to 4000 inhabitants in each. About 100 to 120 consumers and public lamps. In two of the towns there are Military Barracks to be lighted. Probable consumption to commence with 2 millions each. Price of gas 7s. 6d. per 1000. Newcastle coals cost about 24s. to 28s. per ton. Good sale for coke and other residuals. One man at 20s. per week can do all the work.
Address No. 198, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, GAS-WORKS TO LEASE.
THE Engineer of a Work of acknowledged repute is desirous of LEASING a small work. Can offer unusual advantages to companies or proprietors whose undertakings are unremunerative, or have fallen into a dilapidated condition.
Address No. 202, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE—A Station-Meter, in good condition, with inlet, outlet, and bye-pass valves and connexions complete. To pass 10,000 cubic feet per hour. Erected by The Gas-Meter Company in 1864, now replaced by them with one of a larger size.
To be seen, and applications made, at the GAS-WORKS, Bromley, KENT.
Sept. 15, 1875.

COAL TAR AND AMMONIACAL LIQUOR.
THE Newton Gas and Coke Company invite TENDERS for all the surplus TAR and AMMONIACAL LIQUOR produced at their works, for a period of One or Three years, as may be agreed on.
Particulars on application to the undersigned.
Tenders to be sent in on or before Monday, Oct. 4, 1875, marked "Tender for Tar," or "Tender for Ammoniacal Liquor," as the case may be.
The Company do not bind themselves to accept the highest or any tender.
JAS. CHAPPLE, Secretary.
Gas-Works, Newton Abbot, South Devon.

CONDENSER, SCRUBBER, AND PURIFEIRS FOR SALE—A BARGAIN.
THE Directors of the Shanklin Gas and Coke Company, Limited, have on SALE the following APPARATUS:—
Two dry lime Purifiers, each 5 ft. by 4 ft. by 2 ft. 6 in. deep, with outlet-boxes, water-lutes, wrought-iron lids, T-iron bearers, cast-iron sieves, lid-lifting gear, 4-in. connecting-pipes, and dry centre change valve complete.
One Annular wrought-iron Condenser, 24 in. diameter and 9 ft. 6 in. high, with inner tube 18 in. diameter, and 4-in. connecting-pipes, fitted with cleaning-out doors.
One wrought-iron Scrubber, to match Condenser, 24 in. diameter and 9 ft. 6 in. high, with four tiers of cast-iron grids, cleaning-out doors, water distributor, tank, 4-in. connecting-pipes, bye-pass valve, &c., complete.
The apparatus is in good condition, and can be seen at the Gas-Works, Shanklin, Isle of Wight, and particulars as to price obtained from W. SUTHERLAND, Secretary.
Gas-Works, Shanklin, Sept. 20, 1875.

BOROUGH OF BARROW-IN-FURNESS—GAS AND WATER DEPARTMENT.
CONTRACT FOR SUPPLY OF GAS COAL, &c.
THE Gas and Water Committee invite TENDERS for the supply of about 6000 tons of GAS COAL and 3000 tons of CANNEL, to be delivered at their works in such quantities and at such stated periods as may be required during the 12 months ending the 31st of December, 1876.
Particulars and conditions of contract may be obtained on application to the Town-Clerk.
Sealed tenders, addressed "The Chairman of the Gas and Water Committee," and endorsed, to be sent in to me not later than the 27th of September, 1875.
The lowest or any tender not necessarily accepted.
By order,
C. F. PRESTON, Town-Clerk.
Municipal Offices, Sept. 3, 1875.

TO GAS ENGINEERS, GAS COMPANIES, FITTERS, CLUBS, IRONMONGERS, BUILDERS, & OTHERS.
Absolute Sale, on the Premises, at 15 and 16, Giltspur Street, near the Holborn Viaduct, London, on Wednesday, September 22, and following day, to commence at One o'clock precisely.
MESSRS. WINSTANLEY and HORWOOD (in conjunction with Mr. Geo. Scamell) will SELL the valuable STOCK, on the Premises, as above, comprising an extensive assortment of handsome modern gaseliers, lamps, lanterns, pendants, standards, gas-meters, gas-stoves, fittings, publicans mullers, spirit measures, tea urns, and a variety of bronze, copper, and brass goods, incidental to the trade, together with the lathes, machines, tools, test-meter, and trade fixtures.
May be viewed on Monday and Tuesday, Sept. 20 and 21, and Catalogues had on the premises; of Messrs. WINSTANLEY AND HORWOOD, 10, Paternoster Row; and of Mr. GEO. SCAMELL, 40, Upper Thames Street, LONDON.

G. A. BAILEY AND CO., Machinists, Manufacturers of all kinds of Indexes for Gas and Water Meters, Indicators, Tell-Tales for Turnstiles, on an improved principle. Every description of Wheel and Worm Cutting, &c.
86, Crampton Street, Newington Butts, LONDON, S.E.
N.B.—Country Orders executed with despatch.

THE LONDON GASLIGHT COMPANY.
NOTICE is hereby given that the ORDINARY HALF-YEARLY MEETING of the PROPRIETORS of the Company will be held at the Freemasons Tavern, Great Queen Street, Lincoln's Inn Fields, on WEDNESDAY, the 13th day of October, 1875, at Twelve o'clock precisely.
The Transfer Books will be closed on Tuesday, the 28th day of September, until after the meeting.
At the conclusion of the Ordinary Meeting an Extraordinary Meeting of the Proprietors will be held, at which a resolution will be submitted for empowering the Directors to issue the Loan Capital authorized by the Special Acts of the Company by means of Debenture Stock instead of by Debentures, under the powers granted by the Companies Clauses Acts, 1863 and 1869.
By order of the Board,
A. J. DOVE, Secretary.
Dated this 15th day of September, 1875.
MEMORANDUM.—Proprietors must hold capital stocks, or shares paid up to the amount of £250, to be qualified to attend these meetings.

SULPHATE OF AMMONIA.
WHY sell your Liquor when it pays you better to work it up yourselves?
Consult J. JUDGE, Chemical Burner, &c., who has put up several sets for Gas Companies with success. J. J. will undertake the management of this department for any large Company at home or abroad. Success sure and nuisance got rid of.
2, Sussex Terrace, New Road, WANDSWORTH ROAD, S.W.

MR. HODGSON JONES, Memb. Inst. Civil Engineers of London and of Paris, has REMOVED his Offices to 26, Great George Street, London, S.W., where he may be consulted on all questions relating to Gas and Water Works, Drainage, Sanitary Works and Estate Improvements.

TO INVENTORS AND PATENTEES.
MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.
Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.
Patents procured for Foreign Countries.
Information as to cost, &c, supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

COST PRICE SHEETS.
MANUFACTURE AND DISTRIBUTION OF GAS. These sheets are the same as were laid before the Dublin Meeting of the British Association of Gas Managers; but in the REPRINT, NOTES have been added for the guidance of those using them. Copies of the two sheets may now be had, price 5s.
South Shields. W. J. WARNER.

Now ready, Second Edition, price 7s., by post 7s. 3d.,
THE
GAS MANAGER'S HANDBOOK.
By THOMAS NEWBIGGING, A.I.C.E.
The scope of this work is apparent from its title. The First Edition, published a year or two ago, was eagerly sought for, and has been now for some time out of print. The favourable reception accorded to it sufficiently proved that it supplied a generally acknowledged want in the profession. The work has undergone careful revision; much new matter has been added; and the New Edition is published in foap. 8vo., morocco, gilt.
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JOHN HALL AND CO., STOURBRIDGE,
Manufacturers of FIRE-BRICKS, LUMPS, TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.
N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

ALFRED WILLIAMS,
PHŒNIX FIRE-BRICK WHARF,
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GAS ENGINEER AND CONTRACTOR FOR THE ERECTION OF GAS-WORKS,
AND FOR THE
SUPPLY OF RETORTS, FIRE-BRICKS, CAST-IRON MAINS,
AND ALL MATERIALS FOR GAS MANUFACTURE AND DISTRIBUTION.

LIME SUPERSEDED
IN THE
PURIFICATION OF ILLUMINATING GAS
BY
SPENCE'S PATENT DRY COPPERAS.
The only purifying material which removes by one process, without injury to the purifiers, all Ammonia and Sulphuretted Hydrogen. It has been in use for upwards of five years at some of the largest Gas-Works in the Kingdom.
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SPENCE BROTHERS CHEMICAL COMPANY, LIMITED,
VICTORIA CHEMICAL WORKS, BRADFORD, MANCHESTER;
SOLE MANUFACTURERS OF SPENCE'S PATENT DRY COPPERAS,
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SULPHATE OF AMMONIA, VITRIOL, COPPERAS, &c.;
PURCHASERS OF SPENT OXIDE AND AMMONIACAL LIQUOR, AND
CONTRACTORS FOR THE PURIFICATION OF COAL GAS.

TO GAS AND WATER COMPANIES
AND
MUNICIPAL AUTHORITIES SUPPLYING WATER OR GAS.

CONSPIRACY AND PROTECTION OF PROPERTY ACT, 1875.

It is required, under a **Penalty of FIVE POUNDS**, that a **Printed Copy** of the **4th Section** of the above Act shall be posted up at all Gas and Water Works in a conspicuous place, where the same may be conveniently read by the persons employed thereat.

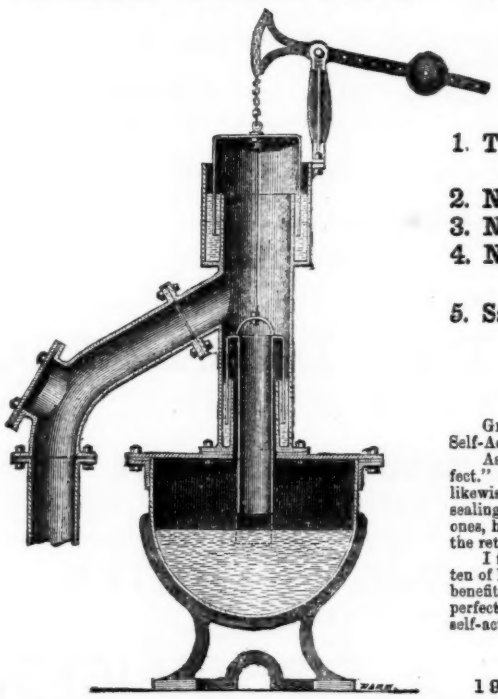
Printed Copies of the Section, in large type, on broad sheets, may be had at the Office of this JOURNAL. Price, per post, 2s. per dozen, or 10s. 6d. per 100.

THE ACT CAME INTO OPERATION ON THE FIRST OF SEPTEMBER INST.

SELF-ACTING REMOVABLE DIP-PIPE,

PATENTED BY

CHANDLER & STEVENSON.



ADVANTAGES.

1. There is no pressure on the Retorts.
2. No deposit of Carbon.
3. No scurfing is required.
4. Never a choked Ascension-Pipe.
5. Saves Fuel and Wear and Tear.
6. Gets 10 per cent. more Gas out of the Coal, and a higher Illuminating Power.
7. Is never out of order.
8. Requires no attention.
9. Is perfectly automatic in its action.

TESTIMONIAL.

Metropolitan District Asylum, Caterham, Surrey, Dec. 14, 1874.

MESSRS. CHANDLER AND STEVENSON.

GENTLEMEN,—I have much pleasure in bearing testimony to the complete working of your "Patent Self-Acting Dip-Pipes," which have now been in constant operation over three months.

As regards the action of the apparatus, I can describe it no better than by calling it "simply perfect." Immediately the retort is charged and the lid secured, the small holder rises, which lifts the Dip; likewise the instant the gas is permitted to escape at the mouthpiece the holder falls, thus perfectly sealing the Dip. I am fully convinced of the superiority of these Self-Acting Dips over Non Self-Acting ones, having experienced the fact that stokers do occasionally neglect to unseal the Dip after charging the retort, thereby causing a waste or loss.

I feel that it is quite unnecessary for me to say more on the subject, excepting that, having had ten of Messrs. Chandler's Dip-Pipes in use more than one year, and having experienced the great benefits derived thereby, inasmuch as the yield of gas from the coal is greatly increased, and the retorts perfectly free from carbon and other advantages, and seeing that the same Dip has been made perfectly self-acting by the second patent, I feel convinced that this is the right thing.—Yours obediently,

W. CRICKMAY, Resident Engineer.

For terms of use and cost, apply to Mr. G. W. STEVENSON,

19, GREAT GEORGE STREET, WESTMINSTER.

SIDNEY LEONI & CO.,

GAS ENGINEERS,

Patentees and Manufacturers of Registered Apparatus for Cooking and Heating by Gas, Complete Kitcheners for Families, Hotels, Clubs, &c. Ovens for Baking and Roasting. Grillers for Broiling. Boilers and Steamers for general use. The New Patent Tubular Safety Gas Boiler; also Heating and Ventilating Stoves, besides other Culinary and Warming Apparatus of their invention, and for which they have been awarded Prize Medals in 1871, 1872, 1873, and 1874.

They have also just been awarded by the Jurors of "The Exhibition of Appliances for the Economy of Labour," now being held at Manchester, the

GOLD MEDAL

For their collection of Patent Atmospheric Gas Apparatus, comprising New Patent Kitcheners for Roasting, Baking, &c., Steamers, Bath Boilers, Heating and Ventilating Stoves, Ornamental Drawing and Dining-room Fire Grates, and other Gas Apparatus, for their novelty, design, workmanship, and utility.

For Pamphlets on the "Advantages of Cooking and Heating by Gas," and Price Lists, &c., apply at the

Adamas Works, 54 to 66, ST. PAUL'S ST., NEW NORTH RD., LONDON, N.

London Depot: 74, STRAND, ADELPHI, W.C.,

Sole Licensees and Agents in Great Britain for

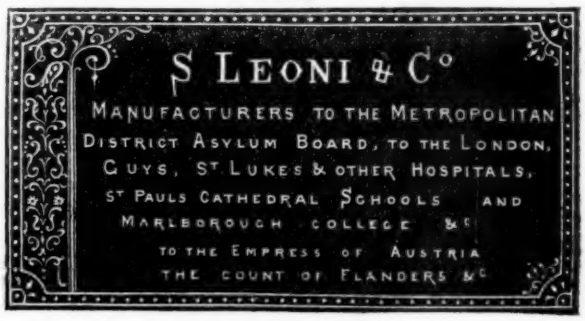
GIROUD'S PATENT RHEOMETER.

This Instrument is easily fixed under any burner; it regulates the volume of gas to be consumed, notwithstanding the size of the burner or the variations of pressure.

PRIZE MEDALS, 1862, 1867, 1871, 1874, 1875.

SOLE AGENTS and MANUFACTURERS of LOOKER'S PATENT WARMING and VENTILATING GAS-STOVES.

(Special Illustrations and Prices on application to our Works.)


S LEONI & Co
MANUFACTURERS TO THE METROPOLITAN
DISTRICT ASYLUM BOARD, TO THE LONDON,
GUYS, ST LUKES & OTHER HOSPITALS,
ST PAULS CATHEDRAL SCHOOLS AND
MARLBOROUGH COLLEGE &c
TO THE EMPRESS OF AUSTRIA
THE COUNT OF FLANDERS &c

THE

IMPERIAL METER COMPANY,

LIMITED,

KING'S ROAD, LONDON, N.W.,

OFFICE: 9, VICTORIA CHAMBERS, WESTMINSTER, S.W.,

MANUFACTURERS OF

"WET" & "DRY" GAS-METERS IN IRON & TIN-PLATE CASES,

STATION-METERS AND GOVERNORS, STREET-LAMP METERS, BOXES, AND REGULATORS FOR THE AVERAGE METER SYSTEM.

TO GAS COMPANIES, ENGINEERS, &c.

These Works are in full operation, and it will be the aim of the New Company not only to keep up the excellent workmanship of their predecessors, but, by the introduction of special machinery, to manufacture **Meters of a higher standard than is usually given, without increasing the cost.**

Special attention is invited to the Compensating Wet Gas-Meter of De Castro and Burton, which is now becoming so generally adopted, and is more simple in construction than any other Compensating or Ordinary Wet Meter. There is but one centre of friction to be overcome by the gas. By its self-adjusting principle it maintains an unvarying water-line; and the reservoir contains sufficient water to supply the Meter for twelve months without attention. It is unaffected by "tilting," and cannot be "flooded" by any pressure.

The Company also manufacture Dry Meters upon the most improved principle, and all their Meters being made to standard gauges, the most accurate measurement is obtained.

Attention is also called to their Dry Meters in Wood Cases, as used by some of the London Gas Companies. These Cases are a great preservation to Tin-plate Meters, especially in seaport towns, where the air is impregnated with salt; they are also particularly suited for export.

The Company repair or convert every description of Wet Gas-Meters to De Castro and Burton's Patent.

LIVESEY FIRE-CLAY WORKS.

NEAR BLACKBURN, LANCASHIRE.

(ESTABLISHED 1835.)

ORLANDO BROTHERS, LIMITED,

MANUFACTURERS OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

THE FARNLEY IRON COMPANY, LIMITED,

FARNLEY, near LEEDS,

MANUFACTURERS OF

FIRE-CLAY GAS-RETORTS & FIRE-BRICKS,

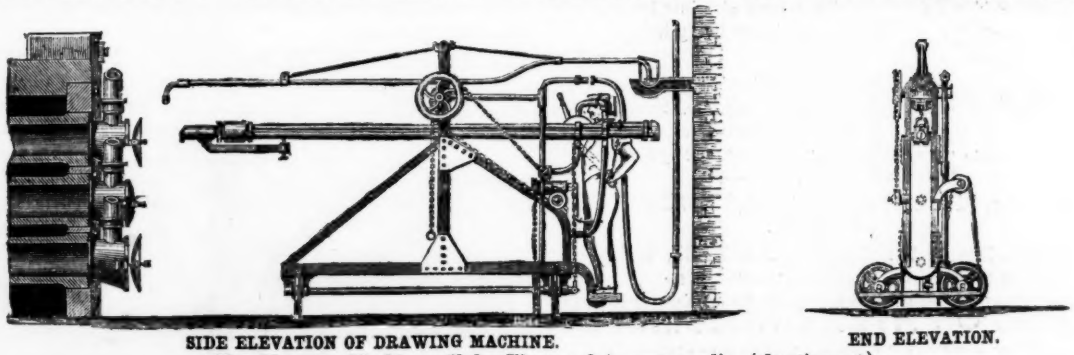
Of every size and shape, and of the best quality; also of White and Coloured GLAZED BRICKS, SANITARY PIPES, &c., &c.

The F. I. Co. have the exclusive right to make and sell Fraser's Patent "Ribbed" Gas-Retorts in Fire-Clay.

In order to meet the constantly increasing demand for their Gas-Retorts, the F. I. Co. have recently made such an addition to their premises as will enable them to execute expeditiously the largest home or foreign orders.

Apply as above, or to the London Offices, 15, NEW BROAD STREET, E.C.

FOULIS'S PATENT STOKING MACHINE.



SIDE ELEVATION OF DRAWING MACHINE. END ELEVATION.

(The Charging Machine will be Illustrated in next week's Advertisement.)

Makers: TANGYE BROTHERS and HOLMAN, London and Birmingham; ADAM WOODWARD and SON, Manchester; ROBERT LAIDLAW and SON, Glasgow; MASCHINENBAU-ACTIEN-GESELLSCHAFT HUMBOLDT, Kalk bei Deutz;

Or all particulars may be had from JAMES WOTHERSPOON, 31, St. Vincent Place, Glasgow.

C. & W. WALKER,
8, FINSBURY CIRCUS,
LONDON, E.C.

MANN & WALKERS' PATENT SCRUBBER.

By Letters Patent in Great Britain, Europe, and the United States of America.

The improvements made during the past three or four years in all the parts of the internal and external construction and machinery of these Scrubbers have rendered them perfect for their work of purification with all kinds of coal, and their cost is less than any other method of completely purifying gas from ammonia.

They contain their own motive power, requiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

They are, in all cases, constructed under guarantees to perfectly perform their work. They are now extensively used in the largest gas-works of London and the chief cities of Europe, **nearly one hundred being in use,** and their perfect efficiency and profit to a gas company have been fully established with every variety of coal used in Europe. References can be given to the largest gas-works in Europe.

By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

Applications relating to dimensions and prices should be addressed to us, C. AND W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C., or to Mr. WILLIAM MANN, late Superintendent of the Chartered Gas-Works, BLACKFRIARS, LONDON; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

T. NEWBIGGING,

CONSULTING GAS ENGINEER,

ECCLES, MANCHESTER.

D. M. NELSON,

46, GORDON STREET (late 135, BUCHANAN ST.), GLASGOW,

Supplies every requisite in connexion with the distribution of Gas and Water.

Estimates and prices on application.

WOOD GRIDS for Purifiers and Scrubbers.

Cast-Iron PIPES and VALVES.

Street LAMP-PILLARS.

Patent Pipe SCREWING-MACHINES, &c.

Mr. ALFRED LASS,

60, CORNHILL, LONDON, E.C.,

Is prepared to open the Books, and, if necessary, keep the Accounts of Gas and Water Companies.

To examine the Books and Accounts, and prepare Balance-Sheets for the information of Directors.

To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

WOLSTON'S TORBAY IRON PAINTS.

THE Torbay and Dart Paint Company, Limited, 23, Great George Street, Westminster, S.W., having been informed that PAINTS not manufactured by them are being offered to Gas Companies and the public as "WOLSTON'S," hereby give notice that they will TAKE PROCEEDINGS against any persons infringing their rights as sole proprietors and manufacturers of Wolston's Torbay Iron Paints.

(See Advertisement on another page.

PATENT FUEL AND LIME FOR PURIFYING FROM FOUL LIME.

By a simple process the Foul Lime is converted into Fuel, by the combustion of which the lime is reproduced as a purifying agent.

Licences to work the invention will be granted to Gas Companies on very reasonable terms.

For further particulars apply to Mr. E. MADDOCKS, Manager of the Gas-Works, KETTERING.

The adoption of the above invention, without a licence from the Patentee, will be an infringement of the patent, and will subject the person or company guilty of such infringement to legal process.

IN THE MATTER OF BRONNER'S PATENT BURNERS.

NOTICE is Hereby Given that Julius Brönner, on the 20th of April, 1875, in a suit in Chancery, 1874, B 365, obtained an injunction perpetually restraining the Defendant, his Agents, Servants, and Workmen, from in any way advertising or offering for sale, or selling, or from in any manner causing to be advertised, or offered for sale, or sold as "Real Brönner," or "Brönner," or "Broebner" Burners, any Burner not manufactured by or for the Plaintiff, Julius Brönner, or by his Agents.

JACKSON, FOX, AND ELLEN,
55, Chancery Lane, London,
Solicitors for the Plaintiff,
JULIUS BRÖNNER, Frankfort-on-Maine.

BAILEY'S Patented Inventions are now in extensive use wherever steam is known. Bailey's Patent Steam Gauges, Pyrometers, Water Gauge Cocks, Test Pumps, Fusible Plugs, Steam and Water Valves, Safety Valves, Junction Valves, Pumps, Tell-Tales, Recorders, Lightning Conductors, Electric Telegraphs, Turret Clocks, Steam Joint Cement, Lifting Jacks, Boiler Feeders, Lime Catcher and Separator, Injectors and Ejectors, and every description of first-class Brass Work for Engines and Boilers. Gas-Works Managers who have not our large book should send for it.

16th edition, 1000 engravings, 4to., post free 2s. in stamps, weight 10 oz., cost of production £1000,

BAILEY'S Illustrated Inventions, containing details and prices of goods in our five several departments:—(1) Brass Foundry, Steam Gauges, Indicators, Feeders, and Fittings; (2) Engineers Sundries, Small Tools, and Stores; (3) Machine Pump and Fire Engine: (4) Turret Clock, &c.; (5) Electric Telegraph, A B C Instruments, Bells, and Apparatus.

J. BAILEY and Co., Albion Works, Salford, LANCASHIRE.

BRAY'S PATENT ENAMEL REGULATOR GAS-BURNERS.

We submit the above Burners to Managers of Gas Companies as being worth a recommendation to their consumers. Though the price is little more than that of common Burners, we believe them to be nearer perfection, for general use, than any others, however costly.

By an increasing number of important gas and railway companies they are used as being the best obtainable for general purposes, and have supplanted enormously costly burners, which give good results in the testing-room, but which fail of their effect when brought to the test of general use.

Dr. W. Wallace, F.R.S.E., F.C.S., Gas Examiner to the City of Glasgow, in a lecture on the "Economical Combustion of Coal Gas," delivered to the Philosophical Society of Glasgow in March, 1874, says: "These are the best Burners obtainable at moderate cost," and, after mentioning several other "good" Burners (which ranged in price up to thirty times the price of ours), he continues, "and their performance is no better than that of Bray's Burners."

Wholesale of our numerous Wholesale Agents.
Manufacturers,

GEORGE BRAY AND CO., BLACKMAN LANE, LEEDS.

PLUTONIC CEMENT.

(REGISTERED.)

Indispensable to the Profitable Manufacture of Gas.

SOLE MANUFACTURER,

WILLIAM RICHARDSON,

CHARLES HENRY STREET & BISSELL STREET, BIRMINGHAM.

Gas Apparatus of all Descriptions supplied Complete and in Detail.

MESSRS. JOHN BETHELL & CO.,

(ESTABLISHED 1836,)

CONTRACTORS for GAS TAR,

MAKERS OF ANTHRACENE, CREOSOTE, &c.,

CLAYTON CHEMICAL WORKS, MANCHESTER;
SWAN VILLAGE, WEST BROMWICH.

Head Offices: 38, KING WILLIAM STREET, LONDON BRIDGE.

B. GIBBONS, JUN.,

DIBDALE FIRE-CLAY, BRICK, AND GAS-RETORT WORKS,

STOURBRIDGE (Established 1834),

MANUFACTURER OF EVERY DESCRIPTION OF

Burs, Lumps, Stays, Shields & other Bricks, & Gas-Retorts.

A LARGE QUANTITY OF RETORTS ALWAYS IN STOCK.

Circular .	14 in.,	15 in.,	16 in.,	18 in.
Ovals . .	17 in. × 14 in.,	17 in. × 15 in.,	20 in. × 15 in.,	21 in. × 15 in., &c.
D's. . .	14 in. × 14 in.,	15 in. × 12 in.,	15 in. × 13 in.,	17 in. × 14 in., 18 in. × 13 in.
	18 in. × 15 in.,	20 in. × 16 in.,	22 in. × 14 in.,	24 in. × 14 in., 24 in. × 15 in., &c.

Special attention given to the execution of Export Orders.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,

EDINBURGH, AND

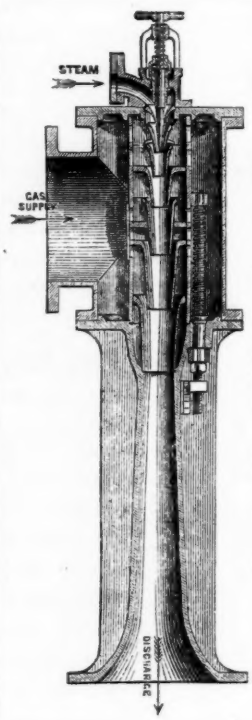
2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

Meter Works in London—2, CROSS STREET, WILDERNESS ROW, E.C.

STATION-METERS, GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,

And every description of Gas-Fittings and Gas Apparatus.



KÖRTING BROTHERS,

SOLE LICENSEES FOR

W. CLELAND'S PATENT STEAM-JET GAS-EXHAUSTER.

E. KÖRTING'S PATENT

STEAM-JET GAS-EXHAUSTER.

Small Cost—Compactness—Perfectly Self-Acting—Self-Regulating—Self-Cleansing—No Steam-Engine—No Attention—No Extra Room Required—No Wear and Tear—No Noise—No Oscillation in Vacuum, or Back Pressure.

UPWARDS OF 150 IN USE IN CONTINENTAL GAS-WORKS.

IN ENGLAND SUPPLIED TO—

Chartered Gas Co., London; London Gaslight Co., London; South Metropolitan Gas Co., London; Phœnix Gas Co., London; Liverpool Gas Co., Linacre; Corporation Gas-Works, Bolton; Cornholme District Gas-Works; Epsom and Ewell Gas Company; Horsham Gas Company; Gaslight Company, Ipswich.

E. KÖRTING'S PATENT STEAM-JET REVIVIFYING BLOWERS FOR THE PURIFYING MATERIAL.

W. CLELAND'S PATENT STEAM GAS-SCRUBBER,

Combining small cost and thorough efficiency, with absence of any mechanical means and necessity of renewing the scrubbing material.

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7, LANCASTER AVENUE, MANCHESTER.
CELLERSTR. 35, HANNOVER, GERMANY.
11, RUE LOUIS-LE-GRAND, PARIS.
222, WALNUT STREET, PHILADELPHIA, U.S.

KÖRTING BROTHERS,

STEAM-JET GAS-EXHAUSTERS AND REVIVIFYING BLOWERS FOR OXIDE.

LONDON AGENT AND AGENT FOR SOUTH OF ENGLAND:

GERALD J. TUPP, 8, John Street, Adelphi, W.C.,

To whom all inquiries for these districts should be addressed.

TO GAS COMPANIES AND THE TRADE.

J. DEFRIES & SONS,

MANUFACTURERS OF

CRYSTAL, BRONZED, & ORMOLU CHANDELIERS, IMPROVED CRYSTAL STAR & SUN LIGHTS, VESTIBULE LAMPS, AND THE PATENT CRYSTAL ILLUMINATION.

A LARGE STOCK ALWAYS IN HAND OF

IRON, BRASS, COMPOSITE, AND LEAD TUBES, FOR GAS AND WATER,

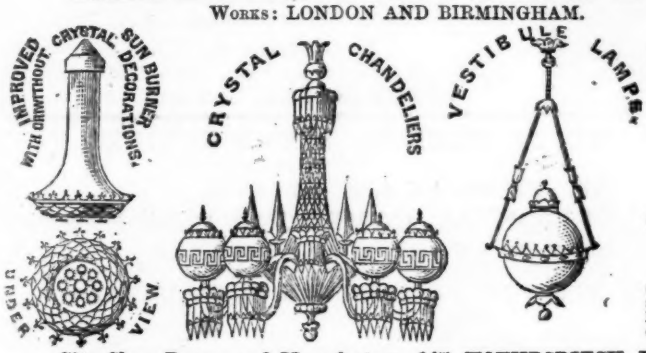
AND EVERY DESCRIPTION OF

GAS AND WATER FITTINGS.

THE PATENT DRY AND WET METER, WITH THE LATEST IMPROVEMENTS.

STREET LAMPS AND COLUMNS IN GREAT VARIETY.

WORKS: LONDON AND BIRMINGHAM.



GAS MOONS, Cut and Engraved, of the newest designs

GAS REFLECTORS In Silver and Glass

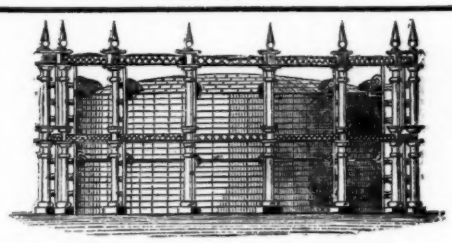
GAS NIBS AND **BURNERS** Of every description.

Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for 1873, are now complete.

City Show-Rooms and Manufactory, 147, HOUNDSDITCH, LONDON.

ESTABLISHED 1830.

HOPE IRON WORKS,



STOCKTON ON TEES.

ASHMORE & WHILE,

GAS ENGINEERS & CONTRACTORS,

MANUFACTURERS OF GASHOLDERS,

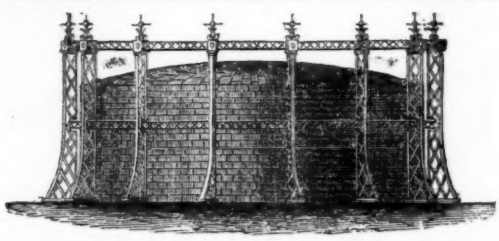
GAS APPARATUS OF EVERY DESCRIPTION,

Including Improved

Retort-Lids, Boilers, Cast and Wrought Iron Tanks, Iron Roofing, Bridges, Girders,

And GENERAL IRONWORK.

N.B—Estimates for all Gas Plant and Remodelling supplied on application.



THE HORSELEY COMPANY,

LIMITED,

TIPTON, STAFFORDSHIRE.

LONDON OFFICE:

6, WESTMINSTER CHAMBERS, VICTORIA STREET,

GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,

AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

THOMAS ALLAN & SONS, of Springbank Iron-Works, Glasgow, manufacture small cast-iron GAS AND WATER PIPES, ½ to 6 inches, at their branch works, Stockton-on-Tees, and have at present a large stock, which they are open to sell at moderate prices

THOMAS CARR & SON,

MANUFACTURERS OF

FIRE-BRICKS, LUMPS, TILES, RETORTS, &c., &c.,

SCOTSWOOD FIRE-BRICK WORKS,

SCOTSWOOD-ON-TYNE.

THOMAS LAMBERT & SONS

MANUFACTURE EVERY DESCRIPTION OF

GAS AND WATER FITTINGS;

ALSO,

WROUGHT-IRON TUBES & FITTINGS.

SHORT STREET, LAMBETH, LONDON.

PRICE'S PATENT COKE & COAL BARROW

effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications addressed to J. SUGG & CO., GHENT, will receive immediate attention.

FIRE-CLAY RETORTS.

WILLIAM FRASER,

INVERKEITHING,

Owner of the Works at which Fire-Clay Retorts were first made), can supply

RETORTS, FIRE-BRICKS, &c., to any extent.

References can be given to managers of above a hundred Gas-Works whom he supplies.

He ships at Charlestown his CELEBRATED HALBEATH STEAM COALS, on Navy List.

JAMES NEWTON & SONS,

(Established 1820,)

FIRE-BRICK AND TILE MERCHANTS,

Wholesale and for Exportation,

FALCON DOCK, 78 AND 79, BANKSIDE,

SOUTHWARK, LONDON, S.E.,

DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for

GAS AND WATER WORKS.

MOBBERLEY & PERRY,

THE HURST

FIRE CLAY and BRICK WORKS,

STOURBRIDGE.

Proprietors of

BEST GLASS-HOUSE POT and CRUCIBLE CLAY.

Manufacturers for Home and Export.

GAS-RETORTS, GLASS-HOUSE FURNACE, BLAST-FURNACE, & TANK BRICKS, LUMPS, TILES,

And Every Description of Best Fire-Bricks.

B. CARPENTER,

THE ORIGINAL MANUFACTURER OF

WOOD SIEVES

FOR

GAS PURIFIERS & SCRUBBERS.

WORKS:

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"SELLARS' CEMENT"

PREVENTS WASTE OF GAS FROM RETORTS;

SAVES CLAY RETORTS FROM DESTRUCTION BY FIRE;

GREATLY ECONOMIZES THE USE OF FIRE-BRICKS;

And PREVENTS ALL POSSIBLE LOSS of GAS FROM LEAKAGE.

J. C. SELLARS,

THE GAS CEMENT WORKS,

BIRKENHEAD.

TORBAY AND DART PAINT COMPANY, LIMITED.

WORKS:
DARTMOUTH AND BRIXHAM, DEVON.

OFFICES:
23, GREAT GEORGE STREET, WESTMINSTER, LONDON, S.W.

SOLE PROPRIETORS AND MANUFACTURERS OF
WOLSTON'S CELEBRATED
TORBAY IRON PAINTS.
(ESTABLISHED 1851.)

TRADE MARK

These Paints have been for many years extensively used in Her Majesty's Royal Dockyards, Woolwich Arsenal, the Shorncliffe and Curragh Camps, War Departments, and Colonies, and are largely supplied to Railway, Harbour, and GAS COMPANIES, Shipowners, Engineering Establishments, Railway Carriage and Waggon Works, and the Paint Trade generally. They are the BEST PROTECTORS of IRONWORK, even arresting corrosion after it has set in; and their base being oxide of iron, they are free from those properties which make lead paints so destructive to ironwork. They do not scale or blister, are not affected by great heat, and are the only Paints which will resist the effects of sulphuretted hydrogen. Their DURABILITY and covering properties have borne the test of A QUARTER OF A CENTURY'S PRACTICAL TRIAL.

The undermentioned colours—ground in best linseed oil, and requiring only before use to be thinned down in the ordinary way—are kept in stock:—

Torbay Brown.	Torbay Red.
Dart Green.	Slate.
Dart Yellow.	Buff.
Brixham Black.	Torbay Chocolate.
Light Blue.	Cream Colour.
Dart Brown.	Dart Umber.
Imperial Stone.	Light Stone.
Bronze Green.	Salmon Colour.
Navy Green.	Lead.
Carriage Red.	Dark Stone.
Light Lead.	Crystal Palace Blue.
Light Green.	Iron Grey.

All other Colours made to order.

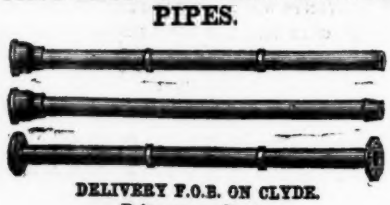
PRICES and TESTIMONIALS on APPLICATION.
(See Notice on another page.)

WATER-MAINS.
COTTERILL'S PATENT STEEL TUBE-DRILLS, for connecting services to water-mains, *under pressure*, without turning off the water. They drill and tap themselves, and are left in the mains. Made of all sizes, from ¾ to 2 inches and upwards. They cost less than the ordinary plan.
Apply to CHARLES FORSTER COTTERILL, Cannock, STAFFORD, Patentee.

TROTTER, HAINES, & CORBETT,
BRETTELL'S ESTATE
FIRE CLAY & BRICK WORKS,
STOURBRIDGE.

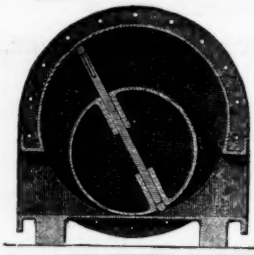
Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS LUMPS, TILES, and every description of FIRE-BRICK.
Proprietors of
BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.
Successors to
E. BAKER AND CO., LATE BRIERLEY HILL, STAFFORDSHIRE.

GAS AND WATER PIPES.
WILLIAM MACLEOD & CO.,
18 & 20, ALSTON STREET, GLASGOW.
CAST-IRON GAS AND WATER PIPES.



DELIVERY F.O.B. ON CLYDE.
Prices on application.

TRADE MARK
J. BEALE'S PATENT GAS EXHAUSTER.

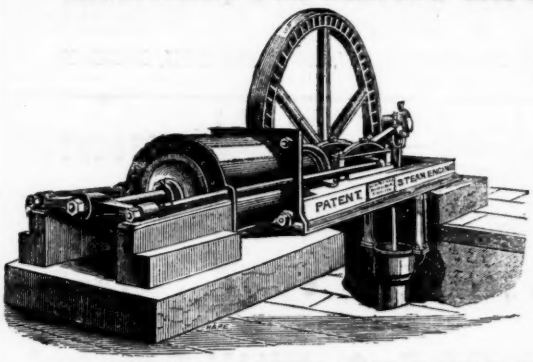


BEALE'S CONTINUOUSLY ACTING GAS EXHAUSTERS
ARE NOW MANUFACTURED BY
B. DONKIN & CO.

MR. J. BEALE, of East Greenwich, having retired from business, has made an arrangement with B. DONKIN & CO. for the sole manufacture of his Patent Solid-Slide Gas Exhausters.
B. D. & Co. also make Steam-Engines to drive Gas Exhausters direct or otherwise, and Gas-Valves.

Estimates and Prices on application to
B. DONKIN & CO.,
ENGINEERS & IRONFOUNDERS,
BERMONDSEY, LONDON, S.E.

ECONOMY OF FUEL IN STEAM-ENGINES.
B. DONKIN & CO.,
PATENT HORIZONTAL COMPOUND CONDENSING
STEAM-ENGINES,
APPLICABLE FOR DRIVING GAS-EXHAUSTERS.



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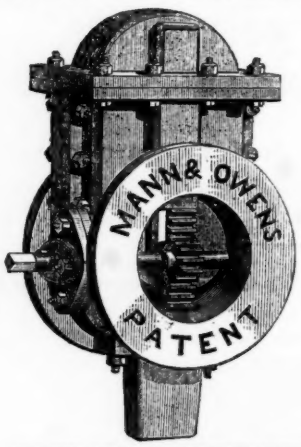

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The slide being operated either by a screw and nut, or by a pinion and rack, a cam bearing upon a plane, cast on the back of the Valve, forces it against the face, and renders the escape of gas an impossibility. By a slight turn of the pinion or screw, the slide is released, and brought away from the face, by which means friction is avoided, and the only force required to open the Valve is that due to its own weight.

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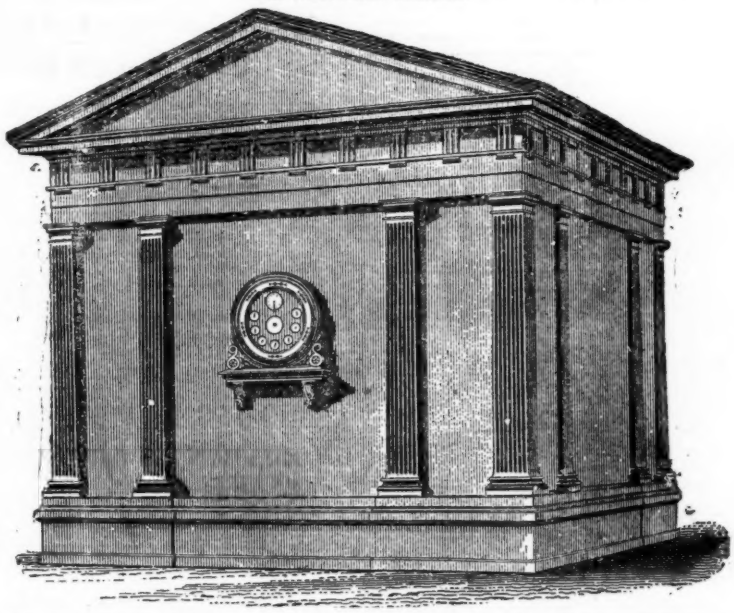

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FOUR-WAY VALVES, one of which is equal to three ordinary Valves.

STATION GOVERNORS—the Gasholder cannot tilt and cause accident.

BREEZE AND TAR FUEL MACHINE.

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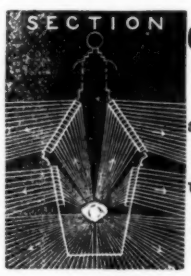

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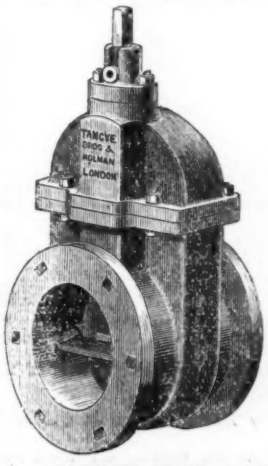

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PRESENT PRICE:

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Cubic Feet.	Illuminating Power.	Coke (sup. qual.).
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This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.

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Analysis by F. J. EVANS, Esq., Chartered Gas Company, Horseferry Road, Westminster:—

(COPY.)

	Cubic Feet of Gas per Ton of Coal.	Illuminating Power in Candles.	Coke per Ton of Coal used.	Ash in Coke, per Cent.	Sulphur in Coal, per Cent.
Silkstone Nuts . . .	10·800	15·85	12·66 cwt.....	6·0	0·69

NOTE.—The illuminating power of the gas was tested by the standard burner now used in London by the Gas Referees, under the City of London Gas Act, 1868.

Horseferry Road, Westminster, March, 1870. (Signed) F. J. EVANS.

These Nuts are extensively used by various Gas Companies throughout the Kingdom, who bear strong testimony to their value.

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SILKSTONE COAL COMPANY, LIMITED,

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Purified gas per ton of coal in cubic feet (average)	**10,775**
Weight of coke in lbs. per ton of coal	**1,465**

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This Company request attention to the very superior quality of their Cannel Coals.

1. The following are the practical results given by Dr. Wallace, of Glasgow, of analyses of their Lochore and Capledrae Cannels:—

	Sample worked at Capledrae.	Sample worked at Lochore
Gas per ton of coal, at 60° Fahr. and 30 inches barometric pressure . .	13,095 cubic feet.	11,760 cubic feet.
Illuminating power, in standard sperm candles, by union jet consuming 5 cubic feet per hour, at ·5-inch pressure	32·91	34·83
Value of 1 cubic foot of gas in grains of sperm	780	836
Equivalent of a ton of coal in pounds of sperm candles	1,459	1,404
Durability of 1 cubic foot by 5-inch flame	69 minutes.	71 minutes.
Gravity of the gas (air = 1000)	596	594

Remarks.—This (the sample from Capledrae) is a Cannel Coal of first-class quality, giving 13,000 feet of 33-candle gas. It contains only a minute proportion of sulphur, and the ash is almost quite white. The coke is of rather inferior quality.

Remarks on Sample from Lochore.—This is a Cannel Coal of first-class quality, giving a large yield of very rich gas and a coke of medium quality.

2. The following are the practical results of analyses by Dr. Wallace of the Company's Waverley Cannels:—

	Capledrae Waverley.	Lochore Waverley.
Gas per ton of coal, at 60° Fahr. and 30 inches barometer	9,120 cubic feet.	11,145 cubic feet.
Illuminating power, in standard candles, by union jet consuming 5 cubic feet per hour, at ·5-inch pressure	36·62	33·09
Value of 1 cubic foot of gas in grains of sperm	878	794
Equivalent of a ton of coal in pounds of sperm candles	1,145	1,264
Durability of 1 cubic foot of gas by 5-inch flame	80 minutes.	67 minutes.
Gravity of the gas (air = 1000)	677	597

Remarks on the Sample of Capledrae Waverley.—This Coal gives fully 9000 feet of gas of 36½ candles, and is admirably adapted for bringing up the quality of gas made from common coal or inferior qualities of cannel. The tests were made at a rather high temperature, this being one of the coals that stand a very high heat without serious diminution of the illuminating power of the gas The coke contains 60 per cent. of ash, and is therefore almost valueless, but the proportion of sulphur is very moderate.

Remarks on the Lochore Waverley.—This is a first-class Cannel Coal, giving 11,000 cubic feet of 33-candle gas. The quantity of sulphur is very minute, and the ash is nearly white. The coke is of inferior quality, but not wholly valueless.

Applications for full Copies of Analyses and Prices may be made to the Company, at

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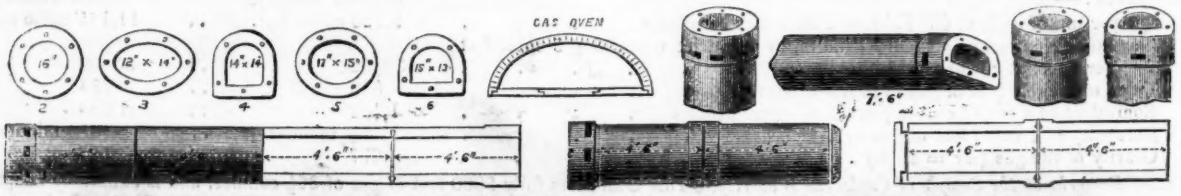

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